





THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, DECEMBER, 1880.

INTRODUCTORY.

IN starting a journal of science for Australia and New Zealand the promoters have in view the providing a ready means of recording the many observations made by scientific students in these colonies, who, whether pursuing science as a profession or as a labor of love, are yet hindered in their progress by the want of some communication with others whose studies are similar to their own.

A faithful record of the proceedings of all scientific societies in these colonies will render considerable assistance in the dissemination of useful knowledge. True, several societies publish their own transactions, but these are generally delayed so as to take the form of an annual volume, whereas this journal will at once give proper prominence to all transactions and papers that may be considered of immediate interest.

Original contributors will find the journal always open, while all workers are cordially requested to aid by furnishing brief notes on subjects of interest, or on work being done here and elsewhere. Notes such as these will doubtless be of great value, and will be welcomed by many who otherwise might be unaware of the extent of useful work actually undertaken.

Secretaries of all scientific societies in Australia and New Zealand are requested to furnish notes of the proceedings of their regular meetings in time for publication in the ensuing number.

The SOUTHERN SCIENCE RECORD will be issued monthly, the price fixed being low, leaving slight room for profit, even with a large list of subscribers. This may be taken as evidence that the promoters do not so much desire profit for themselves as to render willing service in the spread of scientific knowledge.

The title of "THE SOUTHERN SCIENCE RECORD" has been adopted in lieu of that of the SOUTHERN NATURALIST, as at first proposed; the change being considered necessary so as to embrace scientific proceedings of every description.

VICTORIAN FERNS AND THEIR HABITATS.

BY C. FRENCH.

[Read before the Field Naturalists' Club of Victoria June, 1880.]

In preparing the first part of what I hope to be an extensive, interesting, and instructive series of papers for this Club, I must express my regret that some one better adapted for the work than myself had not undertaken to contribute what we may perhaps term our pioneer paper. I have also to express my regret at not having sufficient time at my disposal at present for a more careful description of so important a subject. When I wrote my first paper some years ago for the Horticultural Society of Victoria I had not then the advantage of consulting the splendid work just published by Bentham and Mueller, viz., the seventh volume of the *Flora Australiensis*, but as it is now available, I have been able to make many extracts from it. In the arrangement here adopted I have followed the system of Bentham, viz., commencing with the genus *Ophioglossum* and ending with *Grammitis*, hitherto known generally as *Gymnogramma*.

During the last few years there has been a perfect mania for ferns, and many fine species have been imported from European nurseries and elsewhere, so that there are now some excellent collections to be found in the colonies—private as well as public. According to Bentham and Mueller, there are nearly sixty species of ferns to be found in Victoria, some of which are also natives of New Zealand and other parts of the world. It is not my intention to take up your time on this occasion with a lengthy paper, but I trust that it may prove interesting: and I hope that, at some future date, I may be able to contribute a more detailed notice of the subject under consideration.

Ophioglossum—(LINNÆUS).

Barren frond leaflike, entire or forked, from one to three inches in length, color pale green. Fertile spike, sometimes (in foreign specimens) nearly a foot in length. Spore cases sessile in two rows along the rachis, Rhizome, small and knotty.

1. *O. vulgatum*—(Linnaeus).—This curious little plant is generally to be found in moist situations in various parts of the colony and is commonly known as the *Adder's Tongue Fern*, from the supposed resemblance to the tongue of the adder. This species grows to the height of from one to six inches, the length of the spike varying with the size of the plant, and is easily overlooked by amateur collectors partly I suppose through its being so unlike the generality of Ferns. It is to be found in moist ground near Melbourne, Fernshawe, Grampians, Gippsland, &c., and, according to Bentham and others in North Australia, Queensland, New South Wales, Tasmania, and in most warm and temperate climates throughout the world. This species is of little value for cultivation, as it dies down at the end of the spring, and does not make its reappearance until the Autumn, and rarely succeeds when in cultivation. There is a very curious species found in Queensland and elsewhere, *O. pendulum*, the fronds of which, to the length of from two to three feet, hang suspended from the trees. Cultivation, turfy damp soil, and not too much pot-room; keep moist while growing, gradually withholding the water during dormant state.

Botrychium—(LINNÆUS).

Barren fronds, pinmate or compound. Fertile fronds with branched spikes forming a pedunculate panicle, spore cases sessile in two rows along the branches.

2. *B. Lunaria*—(SWARTZ).—A very beautiful and interesting fern, somewhat rare in the vicinity of Melbourne, and known to collectors as the Moon Fern. There are numerous ridiculous legends in connection with this plant, which, of course, need not be repeated here, but from which its specific name has been derived. This species grows to the height of from seven to eight inches; the fertile spike is about two inches or more in length, and apparently proceeding from the middle of the plant; and, like the *Ophioglossum*, is very cosmopolitan in its character, being found, according to Bentham and others, in Victoria and Tasmania, and is widely spread over the temperate regions of the northern hemisphere; also, in extra-tropical Africa. I have only been fortunate enough to find this fern on one occasion, viz., about twenty years ago, in Studley Park, near the site of the present Lunatic Asylum, although I believe it is not considered rare in some of the north-eastern portions of the colony. To grow this plant successfully, it should be planted in turfy peat, well pressed down into the pot, and kept well shaded; but for the general management of it, that of *Ophioglossum* would suffice. It should be sought for in cleared forest lands, and near a fallen tree, as in tall grass it would be almost impossible to distinguish it from some of the plants growing near it.

3. *B. ternatum*—(SWARTZ).—This is the second species of the genus which is found in Victoria, and is rather more common than the preceding species, being found in the Cape Otway district and in the eastern portions of the colony. I have found it growing on Arthur's Seat, in the Dromana district, also at Cape Schanck, near Mr. J. Barker's station. In appearance, it is different from *B. lunaria*, owing partly to the fertile spike being more branched and broader than that of the latter species. This plant has recently been found by one of our members (Mr. Kershaw, junr.), in the Oakleigh district, and a living specimen was exhibited at our last meeting. The present species is also of a cosmopolitan character—it being found in Queensland, New South Wales, Tasmania, and, according to Bentham and others, in extra-tropical North America, Asia, and in New Zealand. *B. Virginicum* (of Hooker) is a synonym. The habit of the plant is similar to that of *B. lunaria*, and the remarks as to culture, &c., of the latter will also apply to this species. Height from three to five inches.

Schizaea—(SMITH).

Rhizome short, fronds erect, spore cases globular without any rings, opening in two valves, sessile in two rows.

S. bifida—(SWARTZ).—This interesting fern has for a long time been thought very rarely to be found near Melbourne; but, during the last few years, occasional specimens were met with, and within the last few weeks a number of plants have been found in the neighbourhood of Gipsy Village (beyond Brighton), specimens of which, both living and dried, are exhibited here this evening. I may men-

tion that, although I have paid some attention to fern collecting during the last twenty years, I was never fortunate enough to find the plant myself, until a few weeks since, on the occasion of our first "Field Day," when several plants were found by members of the party. In appearance it is (to casual observers) very unlike a fern, being more like some of the order *Juncaceæ* at the first glance, but the appearance of fruiting specimens, with their peculiar pectinated fertile fronds, render the plant easily distinguishable to those who are acquainted with the order. This species, and, in fact, the whole of the genus, do not, as a rule, thrive well in cultivation, and, being deciduous, are often neglected during the few months when the plant is at rest; a superabundance of water is then given, which, of course, destroys the plant at once. This fern, although not so widely distributed as many other species, is also found in North Australia, Queensland, New South Wales, Tasmania, and New Zealand. It grows to a height of from four inches to one foot. Cultivation, sandy peat, plenty of pot-room, abundance of water while in a growing state, gradually decreasing the supply when the fronds are becoming yellow, —and, what is absolutely indispensable, good drainage.

5. *S. fistulosa*—(LABILLARDIERE).—A very pretty species, resembling in general appearance *S. bifida*, but smaller, the fronds more densely tufted, and more slender in texture than the latter species. It grows to about six inches in height, and is much rarer than *S. bifida*. It has been found according to Bentham and others at the Grampians, Gippsland, in Tasmania, also in New Zealand, New Caledonia, Madagascar, and Chili. I have never found this species myself, but have had specimens sent to me from various remote parts of the colony. This plant, like the remaining species of the genus, is rather difficult of cultivation, and does not seem to thrive at all well when treated artificially; although, with care, and attention to the natural requirements of the plant, there is little doubt but that it might be kept at least for a couple of years or so.

Gleichenia—(SMITH).

Fronds repeatedly dichotomous, fan-shaped, color bright green, very distinct from other Australian species, approaching nearer to *G. dichotoma* of North Australia and the tropics than to any other species.

G. flabellata—(ROBT. BROWN).—This splendid fern is one of the most desirable of our native species for growing under cultivation, as it is of graceful habit, vigorous growth, and of easy culture. It is found growing in great luxuriance overhanging the rushing torrents of the Watts river and its tributaries, also in nearly all of our mountain gullies where there is an abundance of running water. It is called by the colonists the "large star fern," and it is much sought after by collectors of ferns on account of its peculiar and striking appearance, and in being easily removed and transported to a distance without much risk. The plant sometimes attains a height of four to five feet, and in this state is really a charming object. This fern is also found according to Bentham and others in Queensland, New South Wales, Tasmania, also in New Zealand and in New Caledonia. Cultivation, black sandy loam, good drainage, plenty of pot-room, abundance of water, and a little shade during the hottest months of summer.

LONGICORN BEETLES OF VICTORIA.

BY D. BEST.

[Read before the Field Naturalists' Club of Victoria, July, 1880.]

MR. CHAIRMAN AND GENTLEMEN,—As you are all, doubtless, aware, at our last meeting I volunteered a paper on the Longicorn Beetles of Victoria. Now, in so doing, I felt at the time that I was going considerably out of my depth, which opinion became very strongly confirmed when it came to the task of commencing this paper, for it was only then that I fully realised the difficulty I had to surmount in my endeavours, with my limited knowledge of the subject, to offer you something that would be both interesting and amusing. I would ask your indulgence for all shortcomings, and as I have no pretensions to be an entomologist, but simply a collector, I do not attempt, indeed I am unable, to describe things in very technical terms, and have endeavoured simply to use those which I hope will be comprehended by all. Another difficulty I labour under is the want of botanical knowledge, which prevents me from being able to name scientifically the trees or shrubs in which the insects may breed, or on which they may feed. It was the hope of obtaining all this information from those possessing superior knowledge that induced me to volunteer this paper, and should it be the means of gratifying this hope, I shall be amply remunerated for my labour. Upon mentioning to a friend the subject of my intended paper he remarked, "Well, how do you intend to commence it, something in this style, I suppose: "Beetles is beetles; there are several kinds of beetles." This at once suggested to me that it would be desirable to explain, so far as I am capable, what a longicorn beetle is. Well, gentlemen, the only description I can give is, that it is a beetle possessing antennæ which, in most instances at least, are as long as the insect, in some much longer, and having also elongated bodies, and very lengthened limbs. The eyes surround the antennæ at their base, thus, as you will perceive by specimens exhibited, differing from the CUCUJIDÆ family, which I at first used to imagine were longicorns. The antennæ are described variously as serrated, or saw-shaped, flabelliform, or fan-shaped and pectinated, or comb-shaped. Of the fan-shaped, which are the most valued, we possess but few species, these being *Distichocera* and *Peisarthrius*, and in both it is only the males that have it, those of the females being much simpler. In another paper I shall have an opportunity of showing you these differences. As I am afraid this description may not be so intelligible as I could wish, I can only add that in my own case I have, by practice learned to know a longicorn instinctively, and no doubt most of you will easily do the same.

Of this class of beetles, the number ultimately found to belong to Victoria will, I believe, be somewhere about 250, of which I have nearly 150 in my own collection, mostly taken within a radius of from 10 to 15 miles of Melbourne. To the entomological collector, Victoria offers no great inducement in the way of brilliancy of colors, the few specimens that can lay any claim thereto belong almost exclusively to the BUPRESTIDÆ family, of which, I trust some of our members will shortly favor the Club with a numerical description. But if we cannot

boast of brilliancy of color we can, at least, claim that we possess longicorns of most peculiar shape, some, as, for instance, the *Hesthesis*, (of which I exhibited some specimens at our first meeting), simulating the HYMENOPTERA, or wasp family; others so closely resembling the *Curculios* as to be, by a beginner at all events, almost undistinguishable from them. Indeed I have myself been deceived in collecting the *Hesthesis*, for the first one I ever captured I took to be a large wasp, and can assure you I was exceedingly cautious in handling it, but it was harmless. On another occasion I mistook a wasp for a *Hesthesis* and got badly stung.

Many of our insects, too, I have found to be specially local; some indeed, I have taken within a space of less than half a mile diameter, and, although I have for years looked outside this apparently charmed circle, I have never succeeded in making a single capture. For this reason I am of opinion it will be many years before the total number of species of any one family can be accurately determined, and indeed, it is a question whether new species are not being continually evolved, as some collectors of many years experience have never until quite recently taken specimens which are now comparatively common. The number I propose this evening to deal with is twelve.

No. 1.—Is the pretty little *Enchoptera apicalis* (Saunders). Observe its very delicate antennæ, slightly tipped with white, and in length falling something short of the insect itself, which generally varies from 7 to 8 lines, a line being the 12th part of an inch; also its, beautifully fine elytra or wing-cases. This insect I have generally taken on the common scrub on the Yarra banks,—(here you will observe my troubles commence, as I cannot scientifically name the tree)—in the latter end of September and October, and I am also informed that in some parts of Gippsland it is very plentiful. Occasionally it will be taken flying but my own specimens have all been captured by shaking the scrub over an umbrella, the narrowness of the insect rendering it almost impossible to detect it otherwise.

Between Nos. 2 and 3 there is scarcely any difference, both being, so far as I know, un-named species of *Macrones*. In No. 2 the thorax is slightly reddish, whilst that of No. 3 is a dark brown. It is quite possible it may be only male and female, the more especially as the latter always runs the larger; but then again, the antennæ of No. 2 are more than proportionately shorter to the length of the insect than are those of No. 3. These will also be taken in the months of September and October, sometimes on the common scrub above alluded to, but more generally on the black wattle, a tree remarkable for the number of insects that breed in it, but I cannot say positively if these do. Whether or not it is widely distributed I cannot say, I myself having only taken it in the neighbourhood of Kew.

(To be continued.)

LECTURES.

ELECTRICITY: ITS PRACTICAL APPLICATIONS
IN AMERICA.

On Tuesday, 23rd ult., Mr. W. Lant Carpenter commenced a short series of public lectures intended to aid in popularising Science. The first lecture was delivered at the Athenaeum Hall, Mr. R. L. J. Ellery in the chair, before a large and appreciative audience, on "Electricity, its Practical Applications in America." The subject was fully illustrated by a great variety of apparatus, diagrams on the blackboard, and the more vivid effects of the sciopticon. Wires were distributed over various parts of the building and strong battery-power provided; the experiments being conducted by Captain R. E. Joseph, of the Torpedo Corps, and Mr. P. R. Challen, of the Telegraph Department. The lecturer first described, in the simplest and clearest manner, the two methods used to generate electricity and the nature of the force resulting from either method. The very great number of experiments and illustrations used would not permit their description in full, but what the audience lost in minuteness of detail was fully compensated by clearness of style. Thus, in very few words the production of heat was explained, the Sciopticon being used to throw on the screen the figure of a small apparatus showing the expansion and heat caused by sending a strong current of electricity through a small wire: by such means mines were fired, and blasting operations on the largest scale easily controlled by the touch of a lady or a child. The telegraph was then described, and other uses of magnetic electricity mentioned whereby a vast number of the ordinary occurrences of city life in America were controlled. Here the lecturer expressed his astonishment that, while the Americans pressed into their service this wonderful force in so many and such varied appliances, they had as yet neglected its use in the form of light, as, to the end of last year, during which Mr. Carpenter spent some months in America, no lighthouse along the American coast had been provided with this superior means of illumination, whereas on the English coasts it had been used in lighthouses for many years. Some of the American Fire Brigade systems were then described and instances given of the extreme rapidity obtained by the use of electricity in conveying alarms to central stations, thence signalling to all out-stations the exact locality of the fire; the first alarm causing the halters to drop from the horses in their stalls, these being so trained as to trot up immediately to their places at the pole of the engine, the harness suspended above being at once lowered on to the horses and fastened by attendant firemen,—who having been asleep, were, by the first alarm, deprived of the bedclothes, tilted through trap-doors to their places at the engine while jumping into trousers and boots sewn together, and ready for an immediate start, all within six seconds from the arrival of the alarm!

Mr. Carpenter then showed how perfect security from burglars was ensured by the use of what are technically known as open and closed contacts.

A description of Edison's Electric Pen was given, and the pen was shown in operation. The Telephone was explained and illustrated by several being set up in communication with a gentleman in another part of the building. The Microphone also was put into operation, and the ticking of a watch conveyed distinctly by means of an ordinary receiving telephone to various parts of the room. That latest and perhaps most wonderful discovery, the Photophone, was then explained, by means of which it was popularly said we would now be enabled to hear shadows; but at present it is impossible to foresee to what this new discovery may lead.

Mr. Carpenter concluded a most interesting and able lecture by urging that the moral of it was that, if electricity and other sciences were thus to be brought into prominent use in our daily lives, it must be apparent to the meanest understanding that increased attention ought to be given to imparting a practical knowledge of such subjects to children attending the primary schools. Book teaching would be of little use, but pupils could easily be taught to make experiments themselves, their minds being thus gradually disciplined to reason correctly.

On Friday, 26th ult., Mr. W. Lant Carpenter delivered the second of his series of popular lectures in the large hall of the Athenaeum, the subject being "The Spectroscope, and its Use in the Investigation of Celestial Bodies," illustrated by Mr. Pirani, who exhibited the very fine electric lamp belonging to the University, kindly lent for the occasion, as was also the strong battery of 50 Bunsen cells belonging to the Harbor Trust. Before entering upon the subject of the lecture Mr. Carpenter took occasion to repeat the suggestion made at the close of the previous lecture, that elementary teaching of science in our primary schools should be made compulsory; and also that, as this colony was desirous of encouraging manufactures, technological education should be insisted on in the higher classes of the primary schools. The lecturer then explained the analysis of light by means of the prism, discovered by Newton. Many years subsequently it was discovered that the characteristics peculiar to light were better displayed by conducting rays through a narrow slit instead of the round hole previously used, and that the resulting colored band or spectrum showed special features according to the special substance from which the light was obtained. Thus each of the gases yielded a spectrum peculiar to itself; and any of the metals or other elementary substances, when raised by heat to a state of incandescence, had likewise distinctive spectra, these again being slightly altered when the substance was heated sufficiently to reach the form of gas. Having made this plain by exhibiting on the screen the spectra of white light, copper, thallium, lithium, and sodium, it became easy to show that, by submitting the light derived from the Sun, planets, and other heavenly bodies to examination with the spectroscope, the nature of the substances contained in those bodies became at once evident. Thus it was shown that the spectrum of the Sun was very similar to that of iron, proving that iron was present in the Sun in large pro-

portions. The red prominences observed during eclipses, the nature of which had long puzzled astronomers, had now been proved by the spectroscope to be composed principally of hydrogen, while the lower portions nearest the Sun were shown to contain heavier gases, such as magnesium. The luminous envelope or chromosphere had also shown a spectrum indicative of hydrogen. The light of the corona had also been examined, but the result in this case had not been so certain. The study of the spectra of stars required much more care and more delicate instruments, but many had been examined frequently, by various astronomers, and now the spectra offered by several of them were well known and had been photographed. The spectra of Sirius and several others were then shown upon the screen. The lecturer then narrated a very pretty effect resulting from spectrum analysis of the Moon during occultation: the spectrum of water in a state of vapor being well known, the light of the stars in occultation was carefully examined when passing from behind the Moon's disc, no change in their ordinary spectra occurring at the precise moment of appearance, such as would have been noticed had watery vapour been present; we are therefore fully justified in believing that the evidence of the absence of water upon the Moon's surface is complete. Variable stars were then described, their spectra showing the three bright lines of hydrogen. Comets were shown to consist almost entirely of gas, and do not, as a rule, contain many terrestrial substances, the principal constituents of these bodies being carbon and hydrogen. The spectra of nebulae showed only three or four bright lines, indicating the presence of hydrogen and some other elementary forms at present unknown to us on Earth. The greater portion of the light of meteorites was due to free hydrogen. A very excellent proof of this was obtained by an examination of meteoric stones. It is known that most of the elementary substances have the power of absorbing into themselves considerable amounts of gases: thus, platinum will absorb great quantities of hydrogen, and silver will absorb oxygen. These gases do not combine chemically with the substances that take them in, but are said to be occluded, meteorites occlude hydrogen, and in the laboratory free hydrogen is easily obtained from meteorites. One of the principal results of spectrum analysis of the stars is, that although the celestial bodies differ from each other very considerably, it is satisfactorily shown that they have all been formed on one general plan of construction.

After the conclusion of the lecture the audience were invited to inspect the spectra of various metals, &c., by means of a direct vision spectroscope, illuminated by a very fine inductorium, under the direction of Mr. G. W. Selby, who also showed some large-sized Giessler tubes.

PROCEEDINGS OF SOCIETIES.

ROYAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of this society was held on the 18th November, the President, Mr. R. L. J. Ellery, F.R.S., occupying the chair. There was a good attendance of members. Dr. P. H. Macgillivray read a paper describing several new species of Polyzoa in the genera *Catenicella* and *Dictyopora*, and a new genus to which he gave the name *Urceolipora*. Commenting on the paper, Mr. W. L. Carpenter stated that in Europe the opinion was gaining ground that temperature had more influence than depth in the distribution of Polyzoa, and suggested that notes on these points would be valuable. Mr. Kernot read a paper describing Professor Graham Bell's latest invention, the Photophone; an instrument by which a beam of light is made to convey sound by altering the electrical conductivity of a piece of *Selenium*. The latter being a metalloid element somewhat resembling sulphur in its chemical and physical properties, and like it, a bad conductor of electricity. If, however, the Selenium is in the crystalline form its conductivity is increased, and this again varies in value as the metalloid is exposed to light or not. It is on this peculiar property that the action of the Photophone depends. The instrument consists of a transmitter and a receiver. The former being a flexible mirror which changes its form, alternately diffusing and condensing a beam of light reflected by it while under the influence of any sonorous vibrations. The receiver is formed by placing a piece of crystalline Selenium in the circuit of the battery connected with an ordinary telephone. A beam of light falling on the Selenium after reflection from the mirror of the transmitter forms a means of varying the conductivity of the Selenium, which then responds to every change in the intensity of light produced by the transmitter, varying its shape according to the sounds it receives. Hence the instrument can be employed at distances where a beam of light may be transmitted, and may be used either by night or day, the influence of artificial light being very little inferior to that of the Sun. The experiments conducted in America by Professor Bell have, so far, been very satisfactory. In the discussion that followed, Mr. Foord gave an outline of the properties of Selenium as far as the effect of structure on its conductivity, stating that the crystalline form may be produced by heating the metalloid until it was just fused, and then allowing it to cool slowly. Mr. W. Lant Carpenter, who was present as a visitor, gave a comprehensive sketch of the telephone, showing how it originated in an endeavour, on the part of Professor Graham Bell, to re-produce visible symbols of articulate sounds for the purpose of more easily teaching deaf mutes to speak. Advised by a friend, he applied himself to the study of electricity as the most likely means to gain the end he had in view; the immediate consequence of which was the discovery of the Telephone.

MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held its ordinary monthly meeting on Tuesday, 25th ult. The President, Mr. Ralph, in the chair. There was a very good attendance of members and visitors, many of the latter being ladies, who evinced particular interest in the proceedings. Rev. A. Cresswell was elected a member, and Mr. J. G. Melvin was nominated for membership. The Rev. Mr. Halley laid on the table a fine photograph illustrative of the marvels of pond-life, prepared by H. C. Richter. Mr. F. Barnard briefly described a fungus he had found on the common garden daisy, which was pronounced to be a species of *Æcidium*, differing from that found on the *Senecio*. Several slides of these fungi were exhibited, and specimens handed round. Dr. Ralph read a few notes on some fossil woods from Tasmania of peculiar interest. One had all the appearance of asbestos, and had indeed been taken to be such by the people who found it. The others had been obtained from volcanic rocks, and were beautiful objects. Several slides of these were exhibited, one particularly being specially interesting from the fact that the mycelium of a fungus penetrating the fibres of the wood was plainly visible. Mr. W. W. Allen briefly described a new microscope by Nachet, having the latest improvements. It could be used either as a monocular or a binocular, and had a variety of objectives, of fine definition, extending to a 1-14 immersion lense. The instrument was exhibited and compared favorably with others. It was still left an open question whether the extra prisms used by German makers in the binocular arrangement did not constitute a serious defect, affecting the brightness of the image. A number of other very good instruments were then set up and a fine series of objects displayed. A pleasant *conversazione* terminated what seemed to have been altogether a most enjoyable evening.

FIELD NATURALISTS' CLUB OF VICTORIA.

On the 17th of last May, at an adjourned meeting held at the Melbourne Athenæum, was inaugurated the above society, the success of which, we are pleased to note, as a gratifying fact. The following gentlemen were elected office-bearers for the current year:—President, Professor McCoy; Vice-Presidents, Dr. Lucas and the Rev. J. J. Halley; Treasurer, E. Howitt; Secretary, D. Best; Committee, J. G. Luehmann, C. French, J. R. Y. Goldstein, J. Wing, W. T. Kendall, and F. A. Leith.

The fortnightly field-days of the Club have been of an enjoyable character, many members having been very successful in their captures and collections. The monthly meetings have been well attended, and a large amount of interest has been evinced in the proceedings, the general conversaziones at the close of each meeting having enlisted marked enthusiasm. The members' list is being augmented each month, and the Club is becoming a very strong and influential one. The papers which have been read have been uniformly interesting, the subjects treated of being "Victorian Ferns and their Habitats," by Mr. C. French;

“Remarks on Marine Algæ,” by Mr. H. Watts; “Longicorn Beetles of Victoria,” by Mr. D. Best; “On the Germination Ferns,” by Mr. J. R. Y. Goldstein; “Some forms of Animal Life in Freshwater Pools,” by Mr. E. Bage; “Remarks on Sea Weeds,” by Mr. H. Watts; “The Platypus,” by F. J. Williams; and on “the Eucalytus,” by J. G. Luehmann. Interesting discussions followed at the close of the reading of each paper. Dr. Müller made some complimentary remarks on Mr. Goldstein’s paper. An animated discussion took place on the reading of Mr. Williams’s paper, bearing specially on the question as to whether the platypus was viviparous or oviparous. The following exhibits were shown at the different meetings of the Club:—By Dr. Lucas—Specimens of European Lepidoptera and Victorian Coleoptera, By Mr. C. French—A very fine specimen of new *Batocera*, from Solomon Island; *Macrotoma heros*, from Fiji; a new *Golianthus* (*Eusidella Morgani*) from Mozambique; and *Macrodonia cervicornis* from Cayenne—one of the largest known Longicorn beetles. By Baron Von Mueller—Dried specimens of two new plants from the Blue Mountains of New South Wales, one being a very handsome *Boronia*, which he has named *B. Barkeriana*, after its discoverer, the other being a very fine *Dacrydium*, also named by him, after its discoverer, *D. Fitzgeraldii*. By Mr. D. Best—A very interesting series of *Hesthesis* and *Agapete*, or wasp beetles, and a collection of Longicorn Beetles, illustrating his paper on that subject. By Mr. Barnard, jun.—A case of insects collected in the neighbourhood of Kew. By Mr. Bailey—Marine shells; a fine collection of shells of the genus *Harpa*, and a new *Voluta*, the first new species of this genus discovered in the colony. By Mr. D. Kershaw—A rare fern, named *Botrychium lunaria*, found in the vicinity of Springvale. By Dr. Ralph—A species of *Fabricia laevigata*, with the terminal buds destroyed by the larvæ of some insect. By Mr. M’Gibbon—A very rare *Curculio*, captured during a recent excursion. By Mr. Dattari—A fine specimen of *Euchirus longinanus*; *Dynastis hercules*, two large *Buprestis*, *Lepidoptera*, &c. By Mr. E. Bage, some beautiful microscopical slides of fern-spores, and specimens of pond-life in illustration of paper. By Mr. Andrews—Some rare birdskins from North Queensland. By Mr. Dickson—*Lepidoptera*, &c. By Mr. Roberts—A well-grown specimen in flower, of the American cowslip *Dodecatheon*. By Mr. Watts—A variety of sea-weeds, well mounted. By Mr. Wing—various lizards, also a peculiar development on Eucalyptus, caused by some small insect. Other exhibits of a varied character were shown, including a very fine Bird of Paradise from New Guinea (*Paradisca Raggianas*), by Mr. Leith.

The Club has been specially fortunate in having fine weather for the field-days.

GEELONG FIELD NATURALISTS' CLUB.

The above Club was established last June, under favorable auspices, Mr. J. Bracebridge Wilson, M.A., being elected the first President, and the members' list being fairly subscribed. In accordance with the Rules of the Club, general meetings have been held every month, the principal papers read being on the "Geology of the District round Geelong, by the Rev. C. S. Y. Price;" "An Account of the Geological Formation of the Eastern Beach, Geelong, by Mr. A. J. Owen;" and "The Microscope," by Mr. W. J. Thomas. Excursions have also been made to the following localities:—Buckley's Falls, Moorabool Valley, Western Beach, and Eastern Beach.

THE FIELD NATURALISTS' CLUB OF SYDNEY.

We are gratified to note that a Field Naturalists' Club is in course of formation in the sister colony, which there is every reason to believe will be as successful as our local club. A number of influential gentlemen have the matter in hand, and it will doubtless not be long before we shall be in a position to give some particulars in relation to the doings of the friends of natural science over the border.

NOTES, MEMORANDA, &c.

EVOLUTION.

There are many naturalists who, having given in their adherence to the Theory of Evolution, are frequently brought face to face with facts that seem to controvert the great theory; but such stumbling-blocks are not long allowed to stop the way. If they cannot by a little manœuvring be shown to blend harmoniously, they are made to do so, in a rough and ready manner, by becoming a basis on which to erect a "law," which law, being theoretical, can be more easily made to support other laws in the same connection, all being finally marshalled to the support of Evolution. In this way, Professor Ray Lankester, in a book lately issued,* being a repetition of his address to the British Association of 1879, seeks to avoid the difficulties suggested by a consideration of the persistent existence of the lower forms of animals, for whom Evolution has certainly not done much; and on this straightway erects a theory of *degeneration*—completely antagonistic to *evolution*, as we would suppose, but, according to Professor Lankester, only additional evidence in its favor. Instances are adduced of what are called "undeniably degenerate animals:" such as internal parasites, barnacles, mites, and ascidians; and it is endeavoured to be shown that because in their younger stages these animals undergo transformations apparently from a higher to a lower form,

* "Degeneration: a Chapter on Darwinism." 8vo. London, 1880.

consequently their adult form is a proof of degeneration. Thus the ascidian is shown to have degenerated from a vertebrate animal, there being no essential difference, so it is said, between the tadpole of the invertebrate ascidian and the tadpole of the vertebrate frog. This will be considered a new departure, by those who remember Darwin's illustrations towards the theory that vertebrate animals were the result of evolution from the invertebrate, from the ascidian in fact, facetiously alluded to by Professor McCoy as "Darwin's young Man." Professor, Ray Lankester on the other hand now seeks to prove that the ascidian is the result of degeneration from the vertebrate animal, and thus we have exemplified the old adage that "extremes meet."

In the same manner M. Edmond Perrier in the *Revue Scientifique* for December 1879, considers he has discovered a law, which he calls the "law of Association" presiding over the formation of all living organisms, and by which the various species are genealogically related. This conclusion was the result of an extended examination of various forms, of life, conducted on the happy line of comparing, not the differences, but the points of similarity between them. Thus M. Perrier endeavours to prove that the various organs that go to make up the whole of any animal are to be considered as distinct individuals, and that each animal is therefore not an individual, but a colony of distinct individuals; notwithstanding that almost all recent teachings point to the definition of an individual as "*equal to the total result of the development of a single ovum.*" By the "law of association" the writer seeks to strengthen the theory of evolution, the fundamental principles of which, he considers, are always left untouched by the objections of opponents. If the latter is true, that such objections are beside the question, the province of advocates ought to be to avoid raising other side issues, which will only contribute further material to be attacked, still leaving untouched all fundamental principles. We cannot avoid the belief that many advocates for evolution indicate that their belief is only partial, by the endeavour to force all laws and all facts into the lists as supports of the favored doctrine. In this way the most remote resemblances between organs in animals otherwise differing greatly are arbitrarily pronounced to be homologues. Homology, as a science, has done, and is doing, grand service in illuminating difficulties in the way of students of Comparative Anatomy, but we do protest against the use of it as indicated above. If the doctrine of evolution is founded on sound principles, as we have every reason to believe it is, the action of so many professed adherents in laying hold of all arguments good or bad in support of the doctrine must be productive of harm. This straining after similitudes, to afford a principle upon which to found a law, is positively dangerous, and, from the indefinable and unsubstantial nature of the evidence adduced, any structure thereupon erected must of necessity be equally unsubstantial. Thus we find the discoverer of this "law of association" commencing with some of the lower forms of life, the hydrozoa, upon their peculiarities seeking to prove the truth of the law, yet stops short abruptly when he reaches the higher animals, and confesses that here the transformation of societies into individuals has still to be investigated. But he does not fear the result, for even if it be against

him, he holds that the generality of the principle will not be invalidated! Those who are interested in working out the question of evolution, would do well to peruse this article, but should this not be within their reach, there is a very fair commentary on it in *Popular Science Review*, Part IV, p. 30, 1880.

Just now when our Government has decided to encourage elementary scientific instruction in the state schools, and teachers are required to qualify themselves to impart such instruction, we have much pleasure in calling the attention of teachers and others to a very useful little book by Professor F. W. Hutton entitled "Zoological Exercises."* To those who are convinced that, while the true method of teaching natural history is the one laid down by Professors Huxley and Martin in their "Practical Biology," the exercises there given are not suitable for the purpose of instruction in these Colonies, Professor Hutton's little book will appear to be the very thing needed. The selected types are more numerous and easily accessible here as well as in New Zealand: and by making the instructions rather fuller than necessary for class work, they may also be found useful for self-instruction. The book commences with a short introduction on the principles of Zoology, such as the Cell, Protoplasm, Theory of Descent Classification, &c., and then gives in Part 1. a series of eight short exercises on the use of the Microscope. Part 2. comprising the bulk of the book, contains twelve exercises in Morphology, each exercise being devoted to one subject. The Sea Anemone, Starfish, Earth Worm Ascidian, Cockle, Periwinkle, Garden Slug, Sea Snail, Shore Crab, the Stick Lizard, the Blue-bottle fly and the Sea Mullet, each in their turn are examined both whole and dissected; the instructions for manipulation being concise and simple to a degree. As mere object lessons these twelve exercises are perfect. The author suggests that students should practice drawing and writing descriptions of the different organs of the animals: and the teacher will find that to make his pupils draw and describe what they see is the best method of examining them. Part 3. contains a synopsis of the Animal Kingdom. Part 4, and last, Systematic Zoology is taught by means of Insects; this group being selected because presenting a great amount of variety, requiring great care in determination, easily obtained, and easily preserved. These exercises are specially designed to strengthen the powers of observation and to teach accuracy. Let us hope that similar class-books, for all branches of science, may soon be required in our elementary schools. We have no fear but that there are plenty of writers amongst us able and willing to arrange material for these as soon as the demand becomes urgent. In the meantime we welcome with pleasure the appearance of Professor Hutton's most valuable little book.

* "Zoological Exercises for Students in New Zealand." 1880. J. Wilkie & Co., Dunedin.

THE ADELAIDE PHILOSOPHICAL SOCIETY.

The Natural History section of the Adelaide Philosophical Society has recently issued, in pamphlet form, "A Scheme for the organisation and direction of the efforts of Amateur Collectors," prepared under the direction of the President, Professor Ralph Tate, and the Treasurer, Mr. T. D. Smeaton. The scheme is specially adapted to secure the co-operation of collectors under the style of "Local Correspondents," the first regulation being as follows:—"The Adelaide Philosophical Society, being desirous of encouraging the study of Natural History, is prepared to direct the efforts of amateur collectors and to receive from them observations and specimens, undertaking to record original observations, and, when practicable, to identify specimens." A note is added that "Eminent Australian naturalists have consented to act as referees in their respective departments." The pamphlet first gives suitable instructions as to forwarding specimens, notes, and communications generally. From these we extract the following pithy remarks:—

"The life history of nearly all Australian animals is meagre, and there is little fear that the information which you can afford is of "no use," because "too little," or is, apparently, "what every one knows." . . . Do not exclude from your local collection any object merely because it occurs frequently or appears insignificant."

The remainder of the pamphlet contains "Short Directions for Collecting and Preserving" mammals, birds, reptiles, fish, insects, spiders, crabs, &c., shells, snails, polyzoa, parasites, plants, seaweeds, fossils, and geological specimens generally. In an appendix is given several very useful recipes for dressing skins, also preservative fluids. Among these we notice "Wickersheimer's fluid," which, alas, has proved utterly unreliable in Victoria. The other fluids have often been tested, and are all good. The scheme altogether is a most commendable one, and ought to produce good results. If some of our Victorian societies would adopt a similar scheme we have every reason to believe that combination of efforts of collectors, under proper organisation, would be mutually beneficial, and would lead to great increase in our knowledge of the Natural History of Australia.

THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, JANUARY, 1881.

VICTORIAN FERNS AND THEIR HABITATS.

BY C. FRENCH.

[Read before the Field Naturalists' Club of Victoria June, 1880.]



PART II.

Gleichenia dicarpa—(SWARTZ).—This is a very handsome species, and is very useful for decorative purposes, and, if properly grown, makes an excellent plant for pot culture and for exhibition purposes. This fern is, in general appearance, much like *G. circinata*, but upon close examination of fruiting specimens the difference is readily detected, the sori being much larger and more globular than in the former species, and the habit of the plant is more suited to open table-land than that of *G. circinata*. This species is found in mountainous situations, on the Dividing Ranges, the Otway, and other heavily timbered districts throughout the colony, and, according to Bentham and others, in New Zealand, New Caledonia, and the Malayan Archipelago. To grow this fern successfully plenty of decomposed vegetable soil should be used, with abundant drainage (this is indispensable), and a never-failing supply of clean water. This plant grows to the height of a few feet. There is a smaller and more villous form from Tasmania known as *G. alpina*, but it is simply a variety of the present species. I may, perhaps, mention that I have found it growing in large quantities on some table-land about a mile on the Healesville side of Jefferson's Watts River Hotel, Fernshawe. In lifting plants of the *Gleichenias* (as in many other ferns) care should be taken to get, if possible, small and compact plants in preference to those of higher and more robust growth, and from as exposed a situation as possible.

Gleichenia circinata—(SWARTZ).—*Syn. G. microphylla, G. rupestris, &c.*—A very well known and beautiful species, known to colonists as the Small Star Fern. This plant is well adapted for cultivation, being easily grown, and makes a very elegant plant for table decoration and for basket work, also as a specimen plant for exhibition purposes. In the scrubby creeks of our mountain regions this curious species may be found climbing, or rather scrambling, up the *Melaleuca* and other plants to the height of from ten to forty feet. I remember on one occasion to have seen a clump of tea-tree *Melaleuca ericifolia*, so covered with this fern that the whole, had it been weighed, must have totalled some tons. The patch was by measurement about fifteen feet square, and so dense was the foliage of the *Gleichenia* that but very little of the *Melaleuca* was visible. To grow this fern successfully

plenty of black sandy soil should be used, with abundance of clean water, good drainage, and a little shade. It may here be observed that although this fern is so commonly found in mountain regions, it is by no means to be considered a local plant, it having been found near Melbourne, at Brighton, Caulfield, Oakleigh, and in other open wastes throughout the colony. According to Bentham and others it is also found in North Australia, Queensland, New South Wales, Tasmania, New Zealand, New Caledonia, the Malayan Islands and peninsula. There is a very pretty variety of it growing in New Zealand called *G. Hecistophylla*. The New South Wales species *G. rupestris* seems to me to be a very distinct form of *G. circinata* (even admitting it to be the same species at all). In the neighbourhood of Sydney it is to be found in great quantities, but the under portion of the fronds is quite glaucous, which is certainly not the case with specimens from any other part of the world. Of course I am not prepared to say that it is a distinct species, still I hold to my opinion, with all due respect to such great botanists as Mr. Bentham, Baron von Müeller, &c.

Todea.

Trunk or rhizome erect. Fronds compound. Spore-cases globular, without any, or only a very obscure, transverse ring, opening to the base in two valves.

Todea barbarea—(T. MOORE) —*Syn. T. Africana*—(WILLDENOW)—*T. rivularis*—(R. BROWN).—This fine species is found in nearly all of our mountain gullies, and is commonly known as the "King Fern." It grows in the beds of creeks and watercourses, and sometimes attains a height of about five feet, but more generally from two to four feet *without the fronds*, which are from two to six feet in length. The stem of this fern grows to an enormous size, and has been known to weigh between three and four tons. As a decorative plant for hardy ferneries, artificial waterfalls, &c., it is invaluable, as it is of easy culture, robust habit, and, when in fruit, has a most pleasing appearance, the sori (according to the description by Bentham and others) being placed in dense masses, usually covering the greater part of the under surface of the lower pinnules of the lower pinnæ, the rest of the frond barren. In cultivation it is very liable to the attack of "Thrips," and care will have to be taken to keep down these gardener's pests, otherwise the fronds will soon turn brown and gradually drop off. To grow this plant successfully it should be planted rather shallow in the soil, well drained, and well watered, but this must not on any account be allowed to become stagnant. In general appearance it somewhat resembles the British *Osmunda*, but of course differs in the disposition of the fructification, fertile fronds, &c. This species is common in the neighborhood of Macedon, Fernshawe, Grampians, Dandenong Ranges, Gippsland, Otway, &c., and, according to Bentham and others, is found in New South Wales, Queensland, and Tasmania, also in New Zealand and in South Africa. I may mention that I can see no difference in the appearance of the specimens which I have received from South Africa and other places. This is the only species found in Victoria, the remaining two Australian species, viz., *T. Fraseri* and *T. Moorei*, being found in New South Wales and adjacent islands.

Trichomanes—(SMITH).

Rhizome creeping, as in *Hymenophyllum*, or short and rather thick. Sori terminal or lateral.

Trichomanes venosum—(R. BROWN).—Commonly known as the Bristle Fern).—A very beautiful, delicate, and graceful species, found clothing the stems of the tree ferns in moist shady situations throughout the fern gullies of Victoria. The fronds of this charming little fern are of a beautiful light green, very pellucid, and the venation very distinct,—hence its specific name. The fronds grow to about two to four inches in length, and tree fern stems of ten to thirty feet high, when clothed from the ground to the base of the fronds with this plant, present quite a charming effect. In cultivation, unless care be taken to exclude cutting winds and the direct rays of the Sun, little can be expected in the way of success. I have found it to thrive best when grown under a hand-glass, or in some very secluded and moist part of the cool fernery. As a decorative plant for Wardian cases, small artificial rockeries, &c., it is very useful. In the dark moist gullies of the Dandenong, Fernshawe, Arthur's Seat, and other ranges, it is to be found in great luxuriance, and generally in the company of the charming little filmy ferns (*Hymenophyllum*), of which we shall have something to say as we proceed with this paper. According to Bentham and Mueller, this species is found in New South Wales, Tasmania, and in New Zealand.

Trichomanes caudatum—(BRACKENRIDGE).—This interesting species is very rarely met with in Victoria. To Mr. R. Lucas, of Colac (now of Healesville) belongs the honor of first introducing this species as an indigenous plant. It was sent by him to Baron von Mueller from Cape Otway, and he (in the absence of fruiting specimens) took it to be *T. pyxidiferum*, a plant which it very closely resembles, but Mr. Lucas having afterwards forwarded fruiting specimens, it was at once recognised as *T. caudatum*, hitherto only known from New South Wales and the South Pacific Islands. It may be mentioned that this fern has invariably been found on the stems of *Dicksonia* only; and I have, in my last botanical trip to the Gembrook ranges, been able to find several specimens of this rare species. The fronds are of a rather dark green color, and grow to the length of from one to six inches. To cultivate it the treatment recommended with the previous species will suffice. Collectors who wish to look for this species are advised to search in the darkest and most remote parts of a fern gully which contain *Dicksonias*, although it is quite likely that it will yet be found on the stems of the *Alsophilas*.

Hymenophyllum—(LINNÆUS).

Rhizome slender, creeping, often much branched and matted. Fronds usually small. Sori terminal or lateral. Indusium more or less cup-shaped at the base.

Hymenophyllum rarum—(R. BROWN) *Syn. H. semibivalve*—(HOOKER and GREVILLE).—This singular little fern is somewhat rare in Victoria, although common in Tasmania and New Zealand. The fronds are dark green in color, and, like the other species, it is mostly

found attached to the tree-fern stems, in forest lands, and in mountainous districts. This species is of little use for cultivation except in Wardian cases or in miniature artificial rockeries, &c., as it is very fragile, and the least exposure causes it to wither up and fade away altogether. The fronds grow from one to three inches in length, and, as it generally grows in very secluded places, it is easily overlooked. I have never taken this species myself, but it has been found by F. Mueller at Sealer's Cove, near Wilson's Promontory. It is also found, according to Bentham and Mueller, in South Africa and in extra-tropical South America.

Hymenophyllum flabellatum—(LABILLARDIERE)—*Syn. H. nitens* (R. BROWN).—A very beautiful species found growing in great luxuriance on tree-fern stems in the Dandenong, Otway, Fernshawe, and other mountain districts. The color of the fronds is a bright transparent green, and of a singularly elegant appearance. The length of the fronds is from four to eight inches, and in the New Zealand specimens sometimes even longer. In cultivation this species will succeed better than many of the other kinds, and, although fragile, is somewhat hardier than the other species. To cultivate it successfully it should be grown under glass in a cool place, with almost perpetual moisture, and, as it is naturally of a pendant habit, it should be suspended on a piece of bark or wood from an upright block, and not (as in many cases often seen) attempt to make it grow erect—a common practice with inexperienced cultivators of many plants. Found, according to Bentham and others, in New South Wales, Tasmania, and in New Zealand.

Hymenophyllum javanicum—(SPRENGEL)—*Syn. H. crispatum*—(WALLICH)—*H. flabellatum*—(R. BROWN).—A very fine and in Victoria, a somewhat rare species. This plant will be more familiarly known to collectors as *H. flabellatum*, but *javanicum* being the older name it has been retained by Bentham, Hooker, and others. The fronds of this species are of a beautiful bright green color, and not unfrequently attain a length of six inches when found growing in very dark moist situations. In cultivation it is very ornamental for fern cases, globes, &c., also in the dried state for "fern pictures," &c. To grow it well it should be planted, or rather fastened, on pieces of fern stems, &c., and covered with a hand-glass or some such thing. The glasses should be occasionally wiped out, otherwise the fronds will (to use a gardener's expression) "damp off." Bentham only gives the localities of Sealer's Cove and Apollo Bay for this species, but I have found it in the Dandenong and Arthur's Seat ranges, but very sparingly. Found, according to Bentham and others, in Queensland, New South Wales, Tasmania, and New Zealand, also in East India and the Malayan Archipelago.

Hymenophyllum tunbridgense—(SMITH).—This well-known and universal favourite is found in the deep dark gullies throughout the colony. It is generally suspended from the stems of tree-ferns, and is also found attached to rotten logs of sassafras, dogwood, &c. In the old country we read of it being eagerly sought after amongst dripping rocks in caverns—of course haunted ones,—and in places where fairies and other mysterious personages do hold their nightly

revels. Of course I am not aware whether any such interesting proceedings are gone through nightly in the deep recesses of our mountain gullies; but it may be the good fortune of some of our members who are given to prying in such out-of-the-way places to enlighten us on this and other matters pertaining to the mythical. The fronds of this pretty fern grow to the length of about two or three inches, and are of a dark green color, the little rim-shaped indentation being rather prominent in this species. In cultivation it is very useful for Wardian cases, miniature rockeries, &c. The general remarks as to the cultivation of the other species will suffice for the cultivation of this plant. Found, according to Bentham and others, in Queensland, New South Wales, Tasmania, New Zealand, and widely spread over most temperate and cooler regions of the globe.

ERRATUM.—In the first part of this paper, by an oversight in compilation, an awkward transposition occurs, by which the description of "*Gleichenia flabellata*" is given as the description of the genus. We must trust to the discernment of our readers to rectify the mistake.—Ed.



LONGICORN BEETLES OF VICTORIA.

BY D. BEST.

[Read before the Field Naturalists' Club of Victoria, July, 1880.]

PART II.

No. 4. Is a larger specimen of the same species, and named by Pascoe *Macrones acicularis*. It is readily distinguishable from the two former by being much larger, having a longer and distinctly red thorax, and also by its hindmost legs being relatively rather longer than in those of Nos. 2 and 3. It exists during the months of October to February, and is very generally distributed, as I have taken it round Melbourne, at Macedon, and in the Bullarook Forest. At the latter place Mr. Kershaw, senr., some three years ago, succeeded in securing two of the largest specimens I have ever seen, being fully twice the size of the one now exhibited, and it is doubtful if they were not an entirely new species.

No. 5. *Zoedia divisa* or *triangularis*—(PASCOE).—I am not certain which. This is an exceedingly pretty insect when viewed through a glass of not too high a power. It ranges in length from three to four lines, is widely distributed, and is often taken on the common ti-tree, when in flower, during the months of October and November; but I have taken it in large numbers in December on a flowering scrub on the banks of the Goulburn at Tallarook.

No. 6. *Eburigera octo-guttata* (WHITE) averages in length about four to five lines; the color is lightish brown, varied by the eight white spots from which it derives its name. So far as my experience goes, it is by no means plentiful. I have only taken some two or three specimens, and generally in the months of September or October, on the *Acacia melanoxylon*, or common lightwood trees.

No. 7. *Omophæna tæniata*—(PASCOE)—This is a very peculiar insect, and would at first, probably, not be taken for a Longicorn. Note its antennæ, which appear to be of a uniform thickness, the joints being alternately black and white. The color of the insect is a chocolate brown, with a lighter brown marking down each elytræ. Its favorite haunt is on fallen branches, the leaves of which have become dried: by shaking these into an umbrella you will be almost certain to obtain some specimens. It is most numerous about September and October, and I have taken it plentifully in the neighbourhood of Eltham. It is, however, I believe, widely distributed. In length it will average from two to four lines.

No. 8. *Symphyletes nigro-virens*—(DONOVAN).—This varies from the orthodox brown color of most Victorian longicorns by being, as you will observe, and as its name implies, a light green; in length it varies considerably, some specimens being barely five lines, whilst others will be as much as ten. It is almost universally distributed over this colony and New South Wales, but my own captures have principally been made in the vicinity of the Yarra on the black wattle, in which it also breeds. I have taken it as early as September, and the intervening months up to March.

No. 9. *Symphyletes decipiens* (PASCOE) differs from No. 8 by being of a darker shade of green, indeed almost grey, wanting also the peculiar triangular marking which the former has immediately behind the scutellum; neither does it vary so much in size, its usual length being about seven lines. In habit and duration of season it is otherwise exactly similar to No. 8.

No. 10 is a species of *Uracanthus*,—I do not know its exact name, or even if it is at present named, but it exists from about November to January, and, like many other of our Longicorns, breeds in the wattle *Acacia molissima*, on which it also feeds, as also on a species of prickly scrub—I think it is one of the native currants—*Hymen-anthera banksia*. Its habitat—at least the only spot where I have taken it—is on the banks of the Yarra near Heidelberg. Its color is a light brown, and its length varies from seven to ten lines. I regret I am unable to show the caterpillars of any of my specimens, but during the present summer shall endeavour to supply this vacancy; they are, however, very difficult to obtain.

Nos. 11, 12, and 13 are all species of *Stephanops*, all breeding in the wattle. The first (No. 13) is the common *S. nasuta*, and is rather widely distributed, as I have taken it during the months of December to February about Ballarat, at Mordialloc, and various spots round Melbourne. It varies considerably in length, some being no more than six lines, whilst others will be fully twelve. In color it is a light grey, and, as you will observe has a very long duck-bill shaped proboscis, a peculiarity belonging to the whole of this family. No. 16

is a less common species, although I have occasionally taken half a dozen in a season. In color it differs from the previous one by being of a rather dark grey, and does not run nearly so large, the longest I have ever seen being no more than eight lines. December and January are its months, and its locality the banks of the Yarra near Heidelberg. No. 13 is by far the rarest of the species, and I do not know of one having been taken except by either Mr. Kershaw or myself, and even we have not taken more than about six between us. It differs from the previous two in having striated elytræ, but the markings are so fine as to be scarcely distinguishable without the aid of a glass. Its existence is very short, being about one month, that of February, and on account of its small size, being barely four lines in length, and not half of one in width, is very difficult to take. After shaking the branches of the wattle into your umbrella, you must exercise the greatest patience in very carefully examining the mass of rubbish brought down, otherwise the insect will be almost certain to escape your notice, and is, besides, very quick on the wing.

No. 14.—To this Mr. Kershaw and myself may, I think, also lay claim to being the first finders. I do not know its name, indeed I do not suppose it has as yet received one,—but it is a pretty insect, the elytræ being of a pale green, with a cross of pale yellow near the tips, whilst the thorax is red, and the head black. Its length averages about five lines, the antennæ, which are of an almost uniform thickness, being about three-fourths of the length of the insect. The locality where I have principally taken it is the Plenty River, and its period of existence, say, December and January. I am unable to say where it breeds, but the scrub on which it may be found is the common *Leptospermum lanigerum*, which flowers during these months. I have also taken it on the native currant—(*Hymenanthera banksia*.)

No. 15 belongs to the beautiful *Distichocera* family, its name being *Distichocera par*; the small one is the male and the large one the female. You will observe a material difference in the antennæ of the sexes, those of the male being fan shaped, which all the males of the *Distichocera* family possess, whilst those of the female are slightly club shaped. Its distribution is rather wide, extending from the immediate neighbourhood of Melbourne, to the Plenty River, and, to my own knowledge, as far as the Bullarook forest at Ballarat. It comes in about the middle of December, and lasts to the end of January, and as a rule will only be found on the scrub so common about our creeks *Leptospermum lanigerum*. In color it is a light chocolate brown, varied by a white striated marking down each elytra. The length of the male averages about six lines, and the female, which always runs much larger, about ten or eleven lines.

Nos. 16, 17, and 18 are three species of *Hebecerus*, all named by Boisduval, viz., *H. Australis*, *H. crocogaster*, and *H. marginicollis*, and are readily distinguishable from each other by their color and markings. *H. Australis* is of a generally grey color, so also is *marginicollis*, whilst *H. crocogaster* is black, diversified by light greyish spots. The two latter also differ from *H. Australis*, in that the thorax has a lighter shade of color down each side. In length *H. Australis* and *H. crocogaster* are usually about seven to eight lines, and *marginicollis*

about four. These three species are widely distributed, being found, I believe, over the whole of the colony. They both breed and feed on the common black wattle, and from September to March, and even April, may be taken in large numbers,—indeed I have often shaken dozens off a single tree.

No. 19 is another species of *Distichocera*, viz., *D. Thompsonella*, and is much rarer than the previous one, from which it also differs in color, being black, varied by several white spots on the elytræ and thorax. A shrub known to many as the prickly flowering box *Bursaria spinosa*, when in flower, which is generally in the months of December, January, and February, is what it feeds upon, but it will be necessary to exercise great caution in searching for them, as they are exceedingly quick in taking alarm, and I know I have occasionally allowed them to get away by my not being smart enough. Its length may be fixed at about eight to nine lines.

No. 20.—This is one of the finest, as well as the rarest, of our insects—*Bimia bicolor* (WHITE),—and I feel some pride in stating that I believe I have taken more of them than, perhaps, any other collector—indeed many collectors are indebted indirectly to me for their specimens. It has a very short-lived existence, only lasting from the end of August to the middle of September, and unless you are on the lookout pretty well every day during this period, you will be almost certain to miss the opportunity of securing any. I suspect it breeds either in the yellow box *Eucalyptus melliodora*, or red gum *E. rostrata*, but I am unable to be positive which,—I rather favour the former; and as the locality in which I have taken it is very circumscribed, being only a few acres in extent, and the timber consisting principally of the two kinds mentioned, I cannot be far out in my surmise. It has, as its name implies, two colors, viz., pale yellow, and black. The elytræ are always of the former, whilst the thorax is also of this color, but has a broad distinct marking of black down the centre; the head is likewise yellow, but has a semicircle of black, immediately where it joins the thorax. The antennæ, which are black, and club shaped, average about two-thirds of the length of the insect, which is usually from 11 to 13 lines. In the male, which is much the smaller of the two, the antennæ always exceed the length of the insect, and I have also occasionally noticed a variation in the colour of the elytræ, one or two specimens I have taken having a somewhat unpronounced marking of black.



PROCEEDINGS OF SOCIETIES.

ROYAL SOCIETY OF VICTORIA.

The ordinary meeting of this Society was held on Thursday, 16th December. The President, Mr. R. L. J. Ellery, F.R.S., occupied the chair, and there was a fair attendance of members, associates, and friends. The Hon. John Woods, M.L.A., and Mr. S. Jermyn Masters were elected members. The gentlemen acting as auditors were re-elected, and nominations were invited for the offices of President, Vice-Presidents (two), Hon. Treasurer, Hon. Librarian, Hon. Secretaries (two), and six Members of Council; and it was notified that nominations would be received by the Secretaries before the Council next preceding the March meeting of the Society.

The Librarian reported that during the past month the Society had received 9 vols., and 30 parts, of scientific publications from Europe and elsewhere.

This being the first meeting of the Society since the death of Sir. Redmond Barry, the following motion was submitted by Dr. Neild and unanimously adopted:—

“The Royal Society of Victoria places on record its strong regret at the loss recently suffered by Australian Science, Literature, and Art through the death of Sir Redmond Barry, who, as President of the Victorian Philosophical Institute, out of which the Royal Society grew, may be regarded as one of its founders.”

The President called attention to a new publication, which had just been laid on the table, entitled *The Southern Science Record*: he welcomed its appearance, and he hoped to see it well supported by the members generally.

A communication from Mr. Robert Morrice was then read describing the nests of the Lowan, or “Mallee Hen” of the colonists. These nests are curious structures of dry dust several yards in diameter, heaped up like an ant-hill. The eggs, being placed in the centre of the mound some six feet deep, are said to be hatched by the heat of the Sun’s rays, the young birds making their way out of the nest unaided by the parent bird. The same mounds are used for hatching year after year. The birds lay very late in the season, not earlier than October, when all other birds have reared their broods. In the winter the mounds are left open, the birds throwing out the centre dust so as to leave a funnel-like opening of some two or three yards in diameter. This is taken to be the result of instinct on the part of the parent birds to prevent the ants from destroying the hills. Mr. Morrice dwelt feelingly on the ruthless destruction of birds and eggs, and laments, with much justice, that no effort is made by the Acclimatisation Society to secure birds and nests for their gardens, which could be done at a very trifling expense; but because of this the matter is neglected, whereas if it was an African bird the Society would incur a very great expense to procure it. No bird is more deserving of attention as an aid to our food supply, the flesh being delicious, and the eggs, though very large, the most delicately-flavored of any known. The Rev. J. J. Halley called attention to the fact that the Mallee hen

its strange nest were fully described and illustrated by drawings in Gould's Handbook of the Birds of Australia, and urged that some efforts ought to be made to prevent the extermination of the birds.

The President submitted to the meeting the Sunshine Recorder lately obtained for our Melbourne Observatory, and briefly described it as a solid sphere of glass, about four and a-half inches in diameter, which acted as a burning-glass, and so indicated the extent and continuity of Sunlight by slightly charring a prepared paper slip placed just within the focus of the glass. The instrument was extremely ingenious, and its simplicity was much admired.

The President intimated that the next meeting would be held in March. He now declared the present session closed, and begged to to wish members generally a very happy New Year.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

This Society has no ordinary meeting in December or January, therefore there is nothing to report this month.

FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of members of this Club was held at their rooms, Temperance Hall, Russell street, on the 13th ult. There was a very good attendance, nearly forty gentlemen being present on the occasion. The Rev. J. J. Halley, one of the Vice-Presidents, occupied the chair. The usual preliminary business was gone through, and the following candidates were duly elected members of the Club:—Messrs. D. Crighton, A. B. Joske, G. E. Thureau, F.G.S.; F. A. Harrison, F. L. Stronnan, and J. Stickland. New members were nominated as follow:—Dr. D. Curdie, Rev. C. M. Yelland, W. G. Bruce, J. C. Cole, W. R. Guilfoyle, W. Sangwell, Geo. Milton, — Ely, and W. H. Gordon. Papers were promised respectively by Messrs. Luchmann, French, Leith, and Williams, on the Eucalypti of Victoria, Victorian Ferns, Lepidoptera of Japan, Dogs, Marsupials of Australia, and Habits of the Lyre Bird; and by Dr. Lucas and Mr. Best, on other subjects. Mr. J. G. Luchmann then read the first part of his very interesting paper on the "Eucalypti of Victoria," describing about eighteen species. The difference between the various *genera* was pointed out and fully explained with the aid of diagrams and specimens of the trees and their bark: this was done so clearly as to be readily comprehended by those previously unacquainted with their characteristics. In alluding to the Victorian Ironbark (*E. leucoxylon*) the essayist directed attention to the table published in Baron von Mueller's "Eucalypts of Australia," in order to show that the wood in question was capable of withstanding a greater strain than any other known kind, viz., 4,192 lbs. on a transverse section 2ft. long by 2in. square; the next in order being the Sydney Ironbark (*E. siderophloia*), with a weight of 3,873 lbs. Quite an interesting and instructive discussion ensued

on the conclusion of the paper, with reference to the various matters touched upon by the author as he proceeded; and we have no doubt that, when completed, the paper will prove useful as a reliable reference.

Mr. H. Watts followed with some remarks on the "Sea Weeds of Victoria," in illustration of which he exhibited some specimens of the more showy kinds of the *Rhodosperræ*, or red sea weeds. Some of these had been collected over twenty years, and were as brilliant in color as when first gathered. The principal varieties exhibited were those of the families of *Dasya*, *Plocamium*, *Rhodophyllis*, *Dasyphæa*, *Dictymenia*, *Wrangelia*, and others. Mr. Watts intimated his intention of exhibiting selections of other series at subsequent meetings of the Club.

The following specimens were exhibited:—By O. A. Sayce, thirty-two species of *Coleoptera*; by D. Best, specimens of *Coleoptera*; by J. E. Dixon, thirty-six species of *Coleoptera*; by F. G. A. Barnard, *Coleoptera*; by T. A. F. Leith, male and female *Orioles* and Rufus-breasted Thickheads—(the whole of the foregoing having been taken on the occasion of the late excursion to Pakenham); by Mr. E. Bage, fossil shells found near Woodside, Tasmania; by C. French, *Lomaptera Salvadori* and *L. Jamesii*, from New Guinea; by P. Dattari, *Batocera proserpine*, from Ambogna, and three fine species of *Carabidæ*; and by J. F. Bailey, an interesting series of shells, of the genus *Helix* and others.

The meeting, which was a very enjoyable one, was brought to a close with the usual *conversazione*.

SNAKE-POISON ANTIDOTE.

At the meeting of the Field Naturalists' Club on the 13th ult. the subjoined useful communication was handed to the Chairman by Mr. T. A. F. Leith:—

"The following cure for snake-bite is kept at every police station throughout the Bombay Presidency, and has resulted in the saving of many lives annually:—

"*Liquor Ammonia Fortis*.

"DOSES.—For adults—35 drops in a wineglassfull of water.

"12 to 15 years old—20 to 25 drops in rather more than half a wineglassfull of water.

"8 to 12 years old—15 to 20 drops in nearly half a wineglassfull of water.

"4 to 8 years old—10 to 15 drops in a tablespoonfull or so of water.

"4 years old and under—From 3 to 10 drops in a tablespoonfull of water."

[We give this as requested, but think that our Australian antidote, the injection of ammonia, is more to be relied on. Still, in the absence of the necessary appliances, the administration of ammonia internally, as above advised, may be of some use.—ED.]

FIELD EXCURSION TO PAKENHAM ON PRINCE OF WALES BIRTHDAY.

A number of the members of the Club availed themselves of the occasion of the above-named holiday to have a day's "fielding" at Pakenham. An early start was made by train, and the *rendezvous* duly reached, some members being met on the way by resident members of the Club. A most beautiful day greeted the excursionists. The previous heavy rains, however, had made the ground rather damp and swampy. But the members of the party were nothing daunted, and applied themselves heartily and earnestly to the work which they had respectively set themselves. Although not nearly so successful as they had anticipated, the excursionists, nevertheless, achieved a fair amount of success, having secured a variety of interesting objects. On arrival at their destination the party divided themselves into groups, each group being devoted to a special department of collection. The country offers a good field for the naturalist, as gullies and swamps are numerous, and there is plenty of common scrub *Leptospermum scoparium*, on the flowers of which many of our rarest insects are to be found feeding. The members were successful in taking Coleoptera, Longicorn, and Buprestis, amongst which may be specially noticed *Distichocera Kirbyi*, *Pytheus latebrosus*, *Eurinus mimula*, *Aphneope sericata*, and a new species of *Zoedia*; and *Stigmodera octosignata* *S. macularia*, *S. australis*, and *S. rectifasciata*. Snakes proved to be scarce, as the season was not quite far enough advanced for these reptiles. Some of the party, however, secured a few specimens of two kinds peculiar to the district, viz., the copper-head *Hoplocephalus superbus*, and the tiger *Hoplocephalus curtus*, both dangerous species. The former is often of so dark a color as to be mistaken for the black snake, from which it is easily distinguishable by the distinct red marking down the sides of the body. The sportsmen met with only moderate success, very few birds being seen that were considered worth bringing to town. The botanical section of the party were more successful, having secured a number of plants, some of which are somewhat rare, notably *Selaginella Preissiana*, *Ophioglossum vulgatum*, *Calochilus campestris*, and others. The company arrived in town by the 10.45 p.m. train, having spent a very pleasant day. It was considered that these excursions ought to be more frequent at this time of the year.

It will be noticed that the excursions of the Club are now made weekly, and the trips extended more into the country, the long daylight being an advantage to collectors. This step has been deemed necessary in view of the present season being one of much activity with the insect world, as well as with other portions of animate nature. On the formation of the Club in May last the excursions were made fortnightly, which was then

considered to be often enough for that period of the year; and excursions have already been made to the following places, with fairly successful results:—Brighton, Survey Paddock, Studley Park, Williamstown, Kew, Caulfield, &c.

NOTES, MEMORANDA, &c.

As dealing incidentally with the question of Distribution, information is requested as to the date and manner of the first appearance in Hobson's Bay of the large mussels now crowding the rocks, piers, and other structures around the Bay, and which constitute a welcome article of diet on the tables of the laboring classes, thousands of tons being annually gathered and distributed as food without affecting the supply. It is said that twelve years ago this species was not to be found in these waters—that its appearance here dates from the arrival of the *Cerberus*, the bottom of this vessel being literally covered with them, the spawn having become attached thereto while in the Red Sea. If this is correct the facts ought to be noted, and it is with this view that we ask for information from those who may know the circumstances. We believe there are many shell collectors, as well as students of the molluscan fauna of this coast, whose opinions on the point would be valuable: we have therefore every reason to hope that our remarks will elicit much valuable information.

The Boston Society of Natural History has been engaged in good work by forming a School of Science where lectures are given to teachers of public schools on Geology, Botany, Zoology, and kindred subjects. These lectures have proved so useful that the Council of the Society resolved to supplement them by the issue of a series of "Guides for Scientific Teaching," in a handy form and at a low price. The following have already issued, and more are promised:—

No. I.—About Pebbles.

No. II.—Concerning a few Common Plants.

No. III.—Commercial and other Sponges.

No. IV.—A First Lesson on Natural History.

No. V.—Corals and Echinoderms.

No. VI.—Mollusca.

No. VII.—Worms and Crustacea.

No. VIII. Insects.

No. IX.—Fishes and Frogs.

No. X.—Reptiles and Birds,

The writers being Mrs. E. C. Agassiz, Professors Alpheus Hyatt, and George L. Goodale. These have produced the most useful guides we have seen. In short, no teacher should be without them. They are not intended as text-books, but solely as aids to teachers,—indeed it is remarked that any attempt to use them as text-books would defeat their object. The method adopted at the lectures to the

teachers is simple and efficient. Each pupil, being supplied with specimens forming the subject of the lecture, is instructed to observe peculiarities and make comparisons with similar objects. In practice it has been found that five hundred can be taught in one class as easily as five: indeed the average attendance at each of these lectures has been five hundred. The mode of instruction suggested in these guides is to induce the pupils to observe and describe what they see, and to ask them questions which have the effect of leading them to observe correctly. The idea is not to teach, in the common acceptance of the word, but to lead each mind to work out for itself the simple problems that arise in the course of study. This sort of knowledge cannot be given by another to the scholar; it must be gained by work, and will be a pleasing and sufficient reward for work. The habit of direct personal observation thus induced enables each pupil to arrive at the necessary conclusions almost unconsciously. The teacher avoids all lecturing; he does not *impart* instruction, and declines answering questions, for the object would be frustrated if he once allowed himself to be used as an animated book of reference. The pupil's difficulties must be encountered by himself. And under the guidance of a few pertinent questions from the teacher this is speedily done, so that each scholar, when the lessons are finished, can "go through the whole process and show the steps he has taken with the specimens." If he cannot do this it is a proof that the work has been done too quickly for him. "The quality of the knowledge gained, not its quantity, is alone to be considered," and a perusal of those little books will speedily convince any-one that the knowledge thus acquired will be of the most durable quality, while the powers of observation will have been cultivated in the highest degree, enabling each pupil to go through life with a better understanding of natural laws. As Professor Huxley stated lately, "It is very certain that the world is not subordinated to man's use. It is even more certain that Nature is the expression of a definite order, with which nothing interferes, and that the chief business of mankind is to learn that order, and govern themselves accordingly." Freely accepting the dictum of this greatest of living authorities, we feel convinced that the method of teaching elementary science laid down by the Boston Society of Natural History is the most efficient we have yet seen.

Nature directs attention to a new test for water, which ought to prove of great use to chemical students. It is obtained by taking a solution of two parts of citric and one of molybdic acids, which is to be evaporated to dryness, heated to incipient fusion, and dissolved in thirty to forty parts of water. The solution thus obtained imparts a blue color to paper immersed in it and then dried at 100°. This paper is bleached by water, and may be used to indicate its presence or absence in alcohol, ether, &c.

All who are in any way interested in securing the admission of general scientific subjects to the curriculum of our primary or advanced schools would do well to peruse the address on "Science and Culture," delivered by Professor Huxley on the occasion of the opening of Sir Josiah Mason's Science College, at Birmingham, on 1st October, 1880. The address is given in full in *Nature* of October 7th, page 545.

We regret to learn that the Exhibition Commissioners have declined to incur any further expense in connection with the Social Science Congress, the sittings of which closed a few weeks ago. It will be a great loss to the community if the labors of the Congress are withheld from publication for the want of the necessary funds. And we take liberty to suggest that the members of the late Congress should enrol themselves as a permanent body, with the immediate view of raising funds to publish the proceedings. A very small subscription would ensure a large list of members, and we have no doubt that the body thus formed would be sufficiently influential to obtain such additional assistance from the Government as would enable the proceedings to be published at once.

As a hint for parents, guardians, and teachers who wish to encourage a taste for natural history in their children and family, the following, taken from a letter just received from a friend in England, may prove useful:—

“Each of my youngsters is provided, according to his proclivities with a herbarium, geological or entomological cabinet, &c.: whenever either of them bring home an insect, flower, or fossil that was not previously in any of the several collections, the finder is rewarded with a penny. If the object is a particularly rare one the reward is increased accordingly, while for an entirely new species I am meditating the offering of really fabulous sums. In order to fix the name of the object upon the memory, the finder is called by it by all in the house until he or she drops upon something else to be properly labelled and classified. My youngest little girl, aged eight, has been Miss *Lythrum roseum* for a whole week, owing to wet weather preventing the making of botanical excursions, but she has just returned with what is to her a new fern, so she will be to night duly christened as Miss *Asplenium trichomanes*.”

The plan seems to be a good one: our correspondent does not say whether it is his own or not. The possibility is that it may have resulted from what he has heard of similar practice on the part of much more celebrated naturalists with whom he is acquainted. This is the more likely, as he has frequently mentioned the systematic methods in which Darwin and Lubbock (who often visit the neighbourhood,—live near it, in fact) go about their work both as to collecting and training their children to observe. Now that science is being introduced into State schools something like the above might be introduced, as it would seem, with advantage among the scholars. Children have eyes often more keen than are those of adults, and their finds, after a little judicious training, would, in many cases, prove of value to science as well as to our national Museums.

AUSTRALIAN METEOROLOGY.

THE AUSTRALIAN SIROCCO.

One of the most tardy of the recent sciences in its progression is meteorology, which has hitherto almost purely consisted of the accumulation of observations. Unless these are accurate, and made at suitable stations, the information to be gained by an analysis of them is small when compared with the labour the whole work entails.

In the continent of Australia there are facilities for obtaining a class of observations that cannot be obtained at present on any other part of the Earth's surface. An area of about 3,000,000 square miles, scarcely interrupted by mountain chains—and these not of great magnitude—or rivers, presents a field from which observations may be obtained which will be peculiarly valuable, because the difficulties that arise in estimating the effect of the topography of the land will be removed.

At present nearly all the observations are confined to the Eastern half of Australia, or that portion East of Long. 131° ; of these, six-sevenths are South of Lat. 30° , hence the only portion of the whole Continent which can be studied is that district comprising Victoria, portions of South Australia, and New South Wales, which would lie South of an imaginary straight line joining Adelaide and Newcastle.

As far as we know this is the district most frequented by the North wind, so hot in Summer and correspondingly cold in Winter.

The origin of this wind during both seasons is an interesting point for research, because, if the theory of the Australian Sirocco can be well established, that of other winds closely allied may be easily deduced, notably those of Arabia and Africa, the topography of those districts closely resembling our own. The origin of the Sirocco in both cases being at or near the respective tropics, the wind then travels towards the contiguous pole.

Looking at a map of Victoria, and the district above-mentioned upon which the meteorological stations are marked, it is noticeable that three large districts exist from which no report is received, viz.:—that North and East of Hay, in Murrumbidgee, the interior of Gippsland, and the Wimmera district, the only station in the latter being Horsham; the others are unrepresented. Amateur meteorologists in any of these districts could do good service by systematically tabulating daily reports so as to be available at the end of every season. We should then soon have sufficient materials for the investigation of the cause and positions of origin of our north wind, which forms so remarkable a feature in the meteorology of Australia.

THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, FEBRUARY, 1881.

VICTORIAN FERNS AND THEIR HABITATS.

BY C. FRENCH.

[Read before the Field Naturalists' Club of Victoria June, 1880.]

PART III.

Cyathea—(SMITH).

Tree-ferns. —The Sori arranged in a single row on each side of the midrib. Sori globular. Spore-cases numerous.

Cyathea Boylei —(F. MUELLER) —(Boyle's slender tree-fern). —This very elegant species was discovered by Mr. D. Boyle, of Nunawading, more than fifteen years ago in the Dandenong Ranges, and the specimen here exhibited was taken from the plant which he presented to the Botanic Gardens, shortly after its discovery. For many years, in fact ever since it was found, it has always been known as Boyle's slender tree-fern, and numerous have been the names which (in the absence of good fruiting specimens) have frequently been hazarded for it. With some it was supposed to be a *Dicksonia*, by others (including myself) an *Alsophila*; but since fruiting specimens have been obtained it has proved to be a true *Cyathea*, closely resembling *C. Cunninghami*, and it has recently been named as above by Baron von Mueller, our talented Government Botanist. In the deep shady gullies of the Dandenong ranges this species is not very uncommon, having been frequently found by collectors during the last few years. It is, however, a local plant, and when found there are generally several together. I have just returned from a botanical trip with some friends to the gullies of the Dandenong ranges, and for the first time had the pleasure of seeing this plant in its native state. It grows in the most inaccessible, shady, and moist parts of the heads of the fern gullies, where there is perpetual shade and water, the first we were shown being a very fine plant about twenty feet high; and the second one may have been some ten feet higher. When once seen it will readily be distinguished from the *Alsophilas*, although the two somewhat resemble each other in the general appearance of the stem. We were indebted to Mr. Gessner, of Mulgrave, for showing us the specimens, which were in really beautiful order. To grow this plant successfully it should be protected from drying winds, as the stem being so very slender it soon becomes dry, and the fronds shrivel and dry up. In a close ti-tree shed it thrives admirably, and with plenty of water and a little care it will amply repay the trouble

bestowed on it. I may mention that if it has to be planted in a somewhat exposed position a slight covering around the stem will be found beneficial. To those who wish to see this plant doing really well under cultivation I would advise them to visit the out-door fernery of Mr. J. C. Cole, of the Richmond Nurseries, where he as a lover of ferns will welcome any persons similarly interested. Height, five to forty feet.

Cyathea medullaris (SWARTZ). A large and very handsome tree-fern common in some parts of New Zealand, also rarely met with in the Cape Otway ranges. This species grows to the height of between forty to fifty feet. The fronds are of a bright green color, and sometimes attain the length of from ten to twenty feet. This is a most desirable species for cultivation, and makes an excellent companion plant for the well-known New Zealand Silver-tree Fern *Cyathea dealbata*. To grow tree ferns successfully they should have abundance of room and a never-failing supply of water at the roots and on the stem. The common practice adopted by many persons in pouring water on to the crown of the plant I consider most injurious, as it causes decay at the base of the fronds, and as a natural consequence the fronds become yellow and fall off. The soil most suitable for tree-ferns generally should be stronger and heavier than that used for the cultivation of the more tender kinds, and as a rule the whole should be thoroughly well drained. In the Cape Otway district, as I have before mentioned, there is a more slender form of this species than the New Zealand one, still it may be the same species.* In the fern gully at the Melbourne Botanic Gardens there are several specimens of this fern, which, in common with the ferns generally in the gully, seem to be doing exceedingly well. The introduction of the epiphytal ferns, such as *Platygyrium grande* and *alcicornis* amongst the arborescent species has a very excellent effect, but I should not advise the placing of these epiphytes on the tree ferns themselves, but rather place them on blocks of wood which could be suspended. According to Bentham and others this species is found in New South Wales, Tasmania, New Zealand, the Malayan Archipelago, and South Pacific Islands.

Alsophila (R. BROWN).

Tree ferns. Sori globular, without any indusium. Spore-cases numerous; sterile, or nearly so, differing, according to Bentham and others, from *Cyathea* only in the want of an indusium.

Alsophila australis. (BROWN) (The Hill Tree Fern). A well known and beautiful tree-fern found growing in mountainous regions of this and the other Australian Colonies (South Australia excepted). This species when well grown is one of the most beautiful and useful of all tree-ferns for artificial cultivation, the fronds being often met with twelve to fifteen feet in length, and of a singularly graceful habit. In the mountain districts of Victoria this fine fern may be found in the vicinity of fern gullies, or apart from them on table-land in secluded parts of the forest. The height is from ten to fifty feet, and accounts have been circulated where it is said to have reached a height

* It is just possible that this species may prove to be identical with "*C. Boylei*," and not *Medullaris* at all.

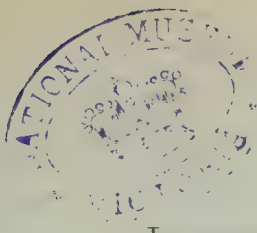
of 100 feet, but I have never seen any which approach this height. As a rule this species does not thrive so well as the common gully tree-fern *Dicksonia antarctica*, excepting in very sheltered positions. In the Fitzroy Gardens there is a very fine specimen which many will have noticed at the lower end of the Elm Avenue leading from East Melbourne. To grow this fern successfully it should be planted in good strong vegetable soil, and rich red loam. During a botanical trip to the districts on the Gippsland Railway line, I came across a rather remarkable combination of these two ferns growing upon one stem, and to all appearance a single plant. The stem of the tree-fern was about thirty feet in height, and I noticed that there were two distinct heads of fronds on the stem, and upon further investigation I found that one of the heads of the fronds was the *Alsophila*, and the other the *Dicksonia antarctica*. I could find no traces whatever of the union of the stems, although I carefully examined the main trunk (which was that of a *Dicksonia*). It seems to me that the two may have been seedlings, and had grown up together. I made arrangements with Mr. Watts, of the River Leng Leng, to bring the plant down to the Botanic Gardens, but it unfortunately was broken to pieces in getting it down to the Drouin Railway station. Mr. Watts, however, tells me that he has found another lately, which he is going to send to the gardens as a donation, so that I trust some of you will have an opportunity of seeing what I take to be a most remarkable object, and one of great interest. I may mention for the information of the uninitiated that a very easy way of distinguishing the *Alsophila* from the *Dicksonia* is to examine the base of the fronds, which in the former are prickly or spiny, and in the latter clothed with a hair-like substance, which, by the way, makes a very good bush styptic in case of a severe cut, &c. The stems also differ, that of the *Alsophila* being generally covered with spiny nodes, while in the *Dicksonia* it is hairy. Found, according to Bentham and Mueller, in Queensland, New South Wales, and in Tasmania. There is a very fine *Alsophila* found in some parts of Queensland and Norfolk Island *Alsophila excelsa*. This is given by Bentham as being synonymous with our common species. I cannot, however, in my humble opinion, agree with Mr. Bentham in this respect, and he very sensibly remarks, it is possible that the study of living specimens in their native habitats may show characters for distinguishing more than one species, and I think we all agree with him in this respect. Perhaps it may not be generally known that *Alsophila excelsa* will thrive out of doors in or near Melbourne. I may, perhaps, be allowed to draw attention to some which were planted out of pots in the Botanic Gardens, some three or four years since, when they were not more than eighteen inches high, fronds and all: now each has a stem alone of two feet. This should be a sufficient reply to those who have no faith in the fact that any perceptible difference in the growth of a tree-fern stem takes place in one's lifetime.

Dicksonia—(L. HERITIER).

Mostly tree-ferns. Fronds large, compound. Sori terminating veins close to the margins of the frond. Indusium, either globular and two-valved or cup-shaped and entire.

Dicksonia antarctica — (LABILLARDIERE). — (The Gully Tree-fern). — This beautiful tree-fern is very common throughout the fern gullies in the mountainous districts of this and the other Australian colonies, Western Australia excepted. It is known to the colonists as the gully tree-fern, owing to its being found growing in the gullies and ranges and not on table-land, as is the case with the *Alsophila*. This species is used very extensively for artificial fern gullies and for export, it being much more easily carried than the *Alsophila*, as the stem retains its vitality for many months when packed in close cases and on board ship. It is also used by the selectors in fencing off their land if near fern gullies, and sections of the stem are polished and sold as ornaments of different sorts, and the stem if chopped in pieces is very useful to fern cultivators as part of a compost for growing the more tender species, but cocoa-nut fibre is preferable if it can be obtained. This species grows to the height of from twenty to fifty feet, and is often found of considerable girth and great weight. This fern is easily grown, requiring nothing else but plenty of room, water, and a little top shade from the direct rays of the Sun, and from hot winds. According to Bentham and others it is found in Queensland, New South Wales, Tasmania, South Australia, also in New Zealand.

Dicksonia davallioides — (R. BROWN). — A very beautiful dwarf species, found but sparingly in Victoria. This is a very useful plant, either for pot culture or for dwarf planting in fern gullies, being of graceful appearance and easy of cultivation. To grow it successfully it should be planted *rather shallow* in the soil, must have plenty of drainage, good vegetable mould, mixed with a little charcoal (to prevent the soil from becoming too compact), and a light shading from the direct rays of the Sun and from cutting north winds. It is found in the district of Cape Otway, Victoria, and, according to Bentham and others, in various parts of New South Wales. It grows to a height of about three or four feet, and it is easily detected from any other fern growing near it. *Dennistædia davallioides* of T. Moore is identical with this species.



LONGICORN BEETLES OF VICTORIA.

By D. BEST.

PART III.

Before continuing my description of Victorian Longicorn Beetles I would incidentally remark, for the benefit of collectors, or those desirous of commencing to collect, that my experience has proved the present month, February, to be the most favorable of the whole twelve for them to be on the look-out, as several of the Eucalypti, viz., the yellow and red box, and red gum, also the prickly flowering box (*Bursaria spinosa*) are in full flower at this period. So many of our Longicorns, more especially the numerous species of *Phoracantha*, *Tryphocharia*, *Cnemoplites*, *Epithora*, *Symphyletes*, &c., as also the much rarer *Stephanops nasuta*, *Neostenus Saundersi*, *Atesta bifasciata*, *Distichocera Thompsonella*, *Peisarthrus marginellus*, &c., may now be secured by the diligent collector, that no opportunity should be lost of making excursions. For *Phoracantha*, *Tryphocharia*, *Epithora*, and *Atesta*, a favorite place will be found to be under the loose bark of the red gum-tree; many a dozen of several varieties of these have I there often obtained; and I well recollect on one occasion, whilst collecting at the Yan Yean, I could have taken, had I so wished, hundreds of specimens off a single tree, as under each piece of bark they were literally swarming. This tree was in full blossom, and seeing some very fine specimens of Longicorns and Buprestidæ flying about rather high up, I could not refrain from making an attempt to secure some of them, but I very quickly gave it up, as the first limb I caught hold of (and it was a pretty thick one, fully eight to ten inches in diameter) broke under my weight, throwing me to the ground and falling across me. Fortunately I was not much hurt, but my unpleasant experience may be useful in putting other collectors on their guard against attempting to secure specimens from high up on this treacherous wood, except they are provided with a net having a long handle in joints like a fishing rod,—an awkward thing for a collector to carry any distance. Of *Symphyletes* several frequent the common wattle (*Acacia molissima*), as do also the *Neostenus*, a very rare insect, and on the flowering box will be found the *Distichocera Thompsonella*, and at least three species of *Schizorhina*, besides many Buprestidæ.

An excursion on the beach at Brighton or Mordialloc will often well repay the collector, more especially if he is enabled to avail himself of the opportunity of going after a hot wind has prevailed for a few days, many insects being blown into the water, washed up, and left by the ebb tide, often still alive. He will probably secure several varieties of *Stigmodera variabilis*, *S. Australis*, *Schizorhina Philippii*, and others much rarer than any of these. Another plan of securing a few good things at this time of year is by providing yourself with a net, proceeding towards the dusk of evening to one of the numerous public parks, or even your own garden, if you are fortunate

enough to possess one, and keeping a sharp look-out for anything on the wing: *Phoracantha* you may almost certainly rely upon, and probably also the scarce *Rugtiphora regicollis*, and other valuable additions to your collection.

21. *Phoracantha fallax*—(PASCOE).—This is one of the commonest of our Longicorns, and may be taken in large numbers at the present time, either under the bark of the red gum-tree, or flying in the dusk of evening. Like all the *Phoracantha*, it breeds in the Eucalypti. In color the elytra are light and dark brown, each being very distinct. The head and thorax are also dark brown. Length, ten to fourteen lines. The antennæ, which in all the males are longer than the insect, are of the serrated order.

22. *P. Quinaria*—(NEWMAN).—Differs but little from the previous one, either as to color, markings, or habits; indeed I find it rather difficult to separate them, but I think, as a general rule, it will be found to be rather narrower, and not having quite so long antennæ.

23. *P. recurva*—(NEWMAN).—Another equally common insect, similar in shape and size to *P. fallax*, but differing considerably in its colors, which are altogether much lighter. From the scutellum, at least half the length of the elytra, the color is very light brown, varied by two dark spots, then a broad band of chocolate brown, and the tips are almost a transparent white. The antennæ run very long, fully one-half more than the length of the insect, and are, perhaps, more distinctly serrated than those of any other longicorn that I know, having the appearance of a fine saw the whole length, with a longer spine at each joint.

24. *P. obscura*—(DONOVAN, &c.).—So far as my experience goes, this is about the rarest of the family; at all events, I have taken but few specimens. It is almost a complete black, having an indistinct lighter band a little below the thorax, and a somewhat more pronounced one rather further down. The thorax is also longer, and is of the same black color, as is also the head. Length, from ten to thirteen lines; antennæ black, serrated, and about one half longer than the insect.

25. *P. punctata*—(DONOVAN, &c.).—A much larger species than any of the foregoing, being fully fifteen to eighteen lines in length. Color light brown, with a darker shade down the middle, which widens towards the end and assumes something of the shape of a paddle. Thorax and head dark brown, antennæ about three-fourths of length of insect, and serrated.

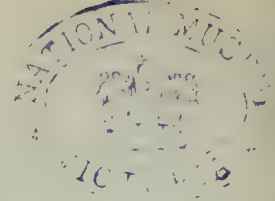
26. *P. tricuspis*—(NEWMAN).—This is by far the largest of the family, and is a grand insect, varying in length from eighteen to twenty-four lines, and in breadth from five to seven lines. Color light brown, with a much darker marking of the shape of a double M a little below the scutellum, and another one of a broad shape more towards the end. Thorax and head dark brown; antennæ same color, often twice its length; and is also provided with immense legs, the hindmost being nearly as long as the insect.

27. *P.* (Sp.).—A very small species of the family, of which I have not been able to obtain the name. In marking and color it is very similar to *P. quinaria*.

28. *Tryphocharia*.—This family is nearly allied to the *Phoracantha*, but runs much broader in the body, and has a smaller thorax. *T. hamata*—(NEWMAN)—Is perhaps the rarest of the three species I possess. In length it is about eighteen to twenty lines; color light brown, with a darker marking like the letter W a little below the scutellum, and another small dark marking still further down; thorax and head dark brown. Antennæ light brown, serrated, and about three-fourths the length of the insect. Season not quite so early as the *Phoracantha*, but will be found in similar places.

29. *T. Mastersi*—(PASCOE).—A much commoner species, especially towards the end of February and during March; varies considerably in size, some being no more than about twelve, whilst others will reach to twenty lines, and broad in proportion. Color, light chocolate brown, with a much lighter-shaded marking on the upper half of the elytræ. Thorax and head chocolate brown, as are also the antennæ, which are serrated, and vary in length from two-thirds to three-fourths of that of the insect.

30. *T.*—(SP.)—This is a much smaller species than the generality of the two foregoing, averaging about fifteen lines. Color light brown, with two black markings across the elytræ, the upper one being a W, and the lower assuming a triangular shape. The spines on each side of the thorax, which is a very dark brown, are strongly defined, as are also those at the joints of the antennæ. The latter run rather longer than the insect, and in color are light brown. Season, February and March. For both *Phoracantha* and *Tryphocharia* the neighbourhood of Melbourne is a very good locality, the various parks and paddocks affording good opportunities for obtaining specimens.



VICTORIAN POND LIFE.

By E. BAGE.

[Read before the Field Naturalists' Club of Victoria, October, 1880.]

IN bringing before you this evening some notes upon a few of the many forms of animal life to be met with in fresh-water pools round Melbourne, I wish at the outset to say that these notes do not claim to record anything new, or to give more than a brief description of forms already well known. I take it, however, that naturalists' clubs are formed quite as much for the purpose of circulating knowledge among the members thereof as for making new discoveries. There is often more to be gained by close observation of common forms of life than in laborious search after new species. And if students of Nature can help each other to learn and understand some of the countless lessons Nature has to teach them, they need not, I think, trouble themselves very much whether such lessons are new or old.

On looking into almost any clear standing pool, our attention is most likely to be first attracted by Tadpoles: these we may often find in the same pond at the same time, in every stage of their growth, from tiny specks embedded in jelly-like masses of spawn up to the fully-developed Frog. But passing over the Tadpoles, our pool, on closer examination, will be found full of smaller forms of life. If we fill a bottle from it and hold it to the light, numbers of tiny animals may be seen darting through the water. These for the most part will be found to belong to that division of the class of Crustacea known as *Entomostraca*. The word *Entomostraca* signifies shell insect, and it is one of the leading characteristics of the *Entomostraca* that, with few exceptions, they have their bodies more or less covered with a shell or carapace of horny consistency, sometimes opaque and sometimes transparent, sometimes formed in one single piece, or shaped like a bivalve shell, or in some genera fitting close to the body like jointed plate armour. There are several genera and very many species of fresh-water *Entomostraca*, but nearly all of them essentially microscopic in character, and with these minute forms I do not propose to take up your time, as observations on them hardly come within the scope of our Field Club. There are, however, two or three larger species of which a description may be of interest.

The *Entomostraca* are generally divided into three groups:—

1. *Branchiopoda*, or gill-footed.
2. *Lophypoda*, or bristle-footed.
3. *Pacilopoda*. (These are entirely marine).

Following Baird's classification, they are further subdivided into six orders, or tribes, of which the first is called *Phyllopoda*, or leaf-footed. To this order of *Phyllopoda* the two largest fresh-water species belong. I have several living specimens of *Chirocephalus diaphanus*, known as the Fairy Shrimp; these were obtained from a pool near Caulfield, where I have found this species for some two years past. The

Chirocephalus averages $1\frac{1}{2}$ to 2 inches in length, and has 11 pairs of leaf-like membranous feet, of which 10 pairs serve as respiratory organs as well as for swimming. The body is slender and semi-transparent, without any external carapace, and is tinged with a pale bluish green colour. The head is furnished with two black and prominent semi-compound eyes; the antennæ are cylindrical, and furnished in the male with fan-shaped prehensile appendages. The tail is forked into two long lamellar appendages of red colour. In the female the ova are very conspicuous, being carried in an external ovarium or egg-sac attached to the under side of the body below the feet. The young, as with many of the *Entomostraca*, on first issuing from the egg, are of the *Nauplius* form, with no resemblance to the mature form until after some weeks' growth. The *Chirocephalus* swims on its back with a graceful undulating movement of its branchial feet. In the one pool in which I have observed them they appear always to prefer the deepest places, and they come swimming near the surface more often in sunny weather. They would be beautiful objects for the aquarium, but unfortunately they never seem to live long when away from their native pool: I have tried over and over again to keep them, but they have nearly always died within a week: on one occasion only have I known one to survive for a period of eighteen days; and I notice that Dr. Baird speaks of the same difficulty of keeping them alive. On examining the *chirocephalus* under the microscope it is often found to be infested with *Vorticellæ* or bell-animalcules, which attach themselves to its body just as they do to plants, and which seem to impede the animal's movements and affect its health.

There is another species of *Entomostraca*,—*Artemia salina*, known as the Brine Shrimp, closely allied to the Fairy Shrimp, and very much resembling it in form, but about one-third the size. This is found in the brine pans of salt works in England, and also in various salt lakes in Europe and America. It would be interesting to know if they are to be found in the salt lakes of this country also. I have not yet had an opportunity of finding this out.

The next of the *Entomostraca* to which I wish to direct your attention is the curious *Apus*, or the Shield-shrimp, belonging also to the order of *Phyllopoda*. Of this species a great many living specimens may be taken from any of the Caulfield pools. The *Apus* is by no means so graceful in appearance as the Fairy Shrimp, but is not without some points of interest. It is about two inches in length, and protected by a large oval carapace, shaped like a shield, which covers the back of the body and the head, but not the tail. It has two large kidney-shaped eyes, set so close together as to look like one. The body is cylindrical and dark-colored: it is composed of thirty segments, and furnished with sixty pairs of branchial feet, of which the first pair are used for locomotion, while the rest keep up an incessant whirling motion apparently for the purpose of stirring up the water and bringing floating particles of food to the mouth. Insignificant as this creature looks, its anatomy would take a life-time to learn. It has in its sixty pairs of branchial feet and other appendages no less than 1,802,604 joints! This number is given on the

authority of Schæffer, a German observer of last century, who had the patience to count them; and it is accepted as approximately correct by later observers. Jurine increases it to upwards of two millions. It is only indirectly that we can form any conception of this vast number, which means that a single *Apus* has about five hundred times as many joints as there are stars visible in the heavens on a clear night—visible, that is, to the naked eye; or, to put another illustration, that there are in this little bottle of ten or a dozen specimens more joints than there are human bones in an army of 100,000 men. I must say I felt incredulous about this number until after careful examination of the creature's limbs with the microscope; and I would have liked to satisfy myself on the point. But what with the difficulty of accurately recognizing what constitutes a joint, and the further difficulty of finding any good-natured friend with more leisure than myself to do a few weeks' steady counting, I am unable either to confirm or dispute Mr. Schæffer's numbers. The *Apus* is tolerably plentiful in some pools round Melbourne, and may be found near the shallow edges of the water, where it works about, stirring up the mud with a constant movement of its feet. It casts its skin frequently, and at shorter intervals in warm than in cold weather. The *Apus* appears to live principally on the smaller *Entomostraca*; indeed so, far as I have been able to observe, the *Entomostraca* generally seem to live on animal food, and, besides acting as scavengers and cleansing the water of decomposing animal matter, the different species often prey upon each other.

In most pools may be found many beautiful specimens of a large species of *Cypris*, one of a numerous family belonging to another order or tribe of the *Entomostraca*, called *Ostracoda*. In this order the carapace is shaped like a bivalve shell, and the respiration is not in the feet, of which there are either two or three pair, but in the jaws. There are many species of *Cypris* to be found round Melbourne, some of them not larger than a pin's head; they are different in colour as in size, black, green, red, brown, etc. The large species above mentioned is one of the most common, and the largest I have met with of this family.

One interesting feature in connection with the *Entomostraca* is in the history of their reproduction. In most of the species, including those just described, there is a double mode of multiplication, sexual and non-sexual: a single impregnation by the male is sufficient to fertilise the female for life, and enables her to produce successive fertile broods of young females, which go on for several generations laying eggs without any generative act: though the production and influence of the male is ultimately necessary for the preservation of the species. Their rate of increase, as may be supposed, is enormous. Jurine estimates that a single fertilised female of *Cyclops quadricornis* may in one year have a progeny of 4,442 million of young. The eggs of the *Entomostraca* retain their vitality for a long time, even when dried up and exposed to extremes of heat or cold. The pool, for instance, where my Fairy Shrimps are taken was last summer for three months as dry as dust. This vitality may help to explain how they get into newly-formed and remote pools, and the explanation throws some

light on the perplexing question of how it is that so many of exactly the same species, of both fresh-water plants and animals, are to be found in isolated pools in different parts of the world. Darwin has clearly shown that migratory aquatic birds can convey in their flight across the ocean the seeds and germs of many forms of life preserved in dried-up mud on their feet. And in this way the occasional appearance of species in places where they have not been observed before may be accounted for.

Although the *Entomostraca* multiply at such a prodigious rate, they by no means have it all their own way in their native habitats. Among their most formidable enemies are the *water-beetles*, of which there are several to be found here, from small species not one-sixth of an inch in length up to the large *Dytiscus*, which leads a curious existence, spending its days in the water and its nights on the wing, flying long distances, and returning to its pond at early dawn. This *Dytiscus* is interesting to microscopists on account of the structure of its first pair of feet; and its elytra, or wing-cases, are beautiful objects for the polariscope. It is by no means a desirable specimen for the aquarium, as it very soon devours and destroys everything else. I once put one into the same collecting-bottle with a fairy shrimp, and it fastened on to it instantly and very soon killed it.

The *water-mites* and *water-spiders* also prey on the smaller *Entomostraca*. I have several of the scarlet mites, *Hydrachna globulus*, placed in an aquarium, where I have had them for several months. They are interesting little creatures, and to be found everywhere round Melbourne, swimming about the pools very rapidly and in a state of constant activity. Another species I have met with resembles *Hydrachna globulus* in size and shape, but instead of being all scarlet, has the anterior portion of the body colored black. The large grey water-spider, described in English works, I have never seen, but Mr. Goldstein tells me he once found some in the Botanical Gardens lagoon, though probably an undescribed species.

I have referred in this paper to a few of the forms of animal life to be found in fresh-water pools. There are many others which I have neither time nor sufficient knowledge to describe,—such, for instance, as the various *Annelida* and *Turbellaria*, the *Limnæa*, or water-snails, and fresh-water limpets, and the larval forms of many insects, some of which, such as the *Caddis* larvæ, build themselves tubular dwellings in the water, very much as the larvæ of the Case moths do on land. We may find, also, two or three species of *Hydra*, and fresh-water *Polyzoa*, and many other interesting objects. In fact, it is a striking illustration of the well-known parable of “Eyes and no Eyes,” that what to the unobservant are mere uninteresting and often unsightly ponds and ditches are to the naturalist, and especially to the naturalist who works with the microscope, native aquaria full of interesting and beautiful forms of life. And, as in every branch of knowledge, the more we learn the more we find there is to learn. I must for my own part confess that, in the last few months, I have learned to look with interest at every pool I pass, and I seldom fill a collecting-bottle without being made to feel my want of know-

ledge by finding in it something new to me. That there is a fascination about this sort of fishing is evidenced by the history of a certain Sir Thomas the Good, of poetic memory, who you will remember was such an enthusiastic Field Naturalist that he would,—

“Pore by the hour o’er a weed or a flower,
Or the slugs that come crawling out after a shower,
And go poking his nose into this, and to that,—
At a gnat, or a bat, or a cat, or a rat,
Or great ugly things,
All legs and all wings,
With nasty long tails, armed with nasty long stings.”

This worthy gentleman ended his days by tumbling into a pond while fishing for tadpoles. And the worst part of the history is that his wife seemed to think it the best place for him. I trust that no such fate may ever befall any member of the Field Naturalists’ Club of Victoria.

PROCEEDINGS OF SOCIETIES.

[There will be no meeting of the Royal or Microscopical Societies till March. We have, therefore, nothing to report for this month.]

THE FIELD NATURALISTS’ CLUB OF VICTORIA.

The Field Naturalists’ Club held its usual monthly meeting at the Temperance Hall on Monday evening, the 10th ult., and, considering the unpleasantly warm weather, there was a good attendance of members, about thirty being present. Dr. Lucas, one of the Vice-Presidents, occupied the chair.

Mr. Haswell, from the Sydney University, was present by invitation, and received a cordial welcome.

The following additional members were added to the roll, which now numbers over 100, viz., Dr. D. Curdie, of Camperdown; Rev. C. M. Yelland, Messrs. W. G. Bruce, J. C. Cole, W. R. Guilfoyle, W. Sangwell, W. G. Rae, and J. Ely.

Amongst the papers promised for the next meeting may be mentioned one by Mr. Haswell on the Marine Fauna of the Eastern Coast of Australia; on the Entomological specimens to be found in the neighbourhood of Healesville, Upper Yarra, by Dr. Lucas; on the Habits of the Lyre Bird, by Mr. F. J. Williams; and continuation of description of the Eucalypti of Victoria, by Mr. J. G. Luehmann.

Mr. Best read Mr. Williams’ paper on the Marsupials of Australia, and although the writer added nothing new to what is already known of these animals, he had evidently carefully studied the subject.

Mr. Leith read the first part of his paper on the various breeds of Dogs, which included the bull, greyhound, and mastiff; and, as it was interspersed with numerous anecdotes illustrative of their respective traits of character, it proved to be very interesting.

Mr. French continued his paper on Victorian Ferns, describing the following additional species.—viz., *Hypolepis tenuifolia*, *Cheilanthes tenuifolia*, *Lindsæa linearis*, *Adiantum Æthiopicum*, *A. formosum*, and *A. hispidulum*.

Mr. Watts exhibited specimens of the *Fucoidæ*, or brown series of sea-weeds, included in the genera *Sargassum*, *Cystophora*, *Halliseris*; *Dictyola*, *Sporochnus*, &c., and, in the course of his explanation, alluded to the list of Australian sea-weeds compiled by Dr. Sonder, of Germany, and issued from the office of the Government Botanist of Victoria. In this list the classification has been somewhat altered from that compiled by Dr. Harvey, the well-known author of several works on sea-weeds.

Attention was drawn by Mr. Goldstein to the comparatively recent appearance in our Bay of a large mussel, no one at the meeting having any recollection of seeing it earlier than about twelve years ago, and some being of opinion that it was introduced here on the sides or bottom of the turret-ship *Cerberus*.

The meeting was brought to a conclusion by the usual *conversazione* and exhibition of specimens, amongst which may be mentioned some fine specimens of Madagascar *Buprestidæ*, by Mr. C. French; *Lepidoptera* and *Coleoptera*, from Healesville and Bunyip, by Dr. Lucas and Mr. J. E. Dixon.

The Committee, at their last meeting, decided on the following Excursions:—

Saturday, 12th February—*Williamstown*: Leaving by 2.30 or 2 train; returning by 6 train.

Saturday, 19th February—*Camberwell*: Leaving for Hawthorn by 1.43 train, thence by 'bus; returning by 6 train.

Saturday, 26th February—*Rosstown*: Leaving by 12.35 Gippsland train; returning by 5 or 6.51: or leaving for Balaclava by 1.29 or 2.9; returning by 6.20.

Saturday, 5th March—*Brighton*: Leaving by 1.29 or 2.9; returning by 5.40 or 6.20.

Saturday, 12th March—*Kew*: *Via* Richmond, by 'bus. Meet at Mr. Barnard's at 2.

NOTES, MEMORANDA, &c.

Referring to a preliminary paper by Mr. J. Bracebridge Wilson in the *Jour. Micr. Soc. Vict.* 1 (1880), on the discovery of *Catenicella* in the Miocene Tertiary beds near Geelong, the *Jour. R. Micr. Soc.* has been favored with the following note on the subject by Mr. Busk:

"The occurrence of *Catenicellidæ* in the fossil state, and so far back as the Miocene epoch, if that be really the age of the beds, is an important and interesting fact. In 1865 the Rev. J. E. Tenison-Woods, in a paper on the fossil Polyzoa of the same district, laid particular stress on the circumstance that the marine fauna of that period differed essentially from the existing fauna in the total absence of *Catenicellidæ*, which form, as it may be said, one of the most characteristic features of the existing Australian marine fauna (so far as the Polyzoa are concerned). It now appears that, in reality, the Miocene fauna was as rich in these forms as it is now. Mr. Wilson enumerates about twenty extinct species, all, he says, different from the existing ones, which, so far as we are aware, do not amount to more than thirty.

"When we consider that beyond the Australian region, including, of course, New Zealand, scarcely more than a single species of *Catenicella* is anywhere met with at the present time, and that none have ever been met with fossil except in Australia, it would seem, so far as this evidence goes, that the Australian Polyzoan fauna was as peculiar to that region in the Miocene period as it is at the present day. The species all seem to have changed, it is true, but they do not appear to have either advanced or retrograded, since, according to Mr. Wilson, the Miocene fossil forms may be classified in the same groups as those of the present time.

"This communication appears to us of the highest interest palæontologically, and it is much to be wished that we should have carefully drawn figures as well as descriptions of the forms mentioned, as, in things so similar, verbal descriptions are insufficient for any critical purpose."

From the *Journal of the Royal Microscopical Society* for December, 1880, we quote the following remarks on work done in Australia.

"The Rev. J. E. Tenison-Woods gives a description and figure of an *Amathia* from Australia, which he considers new, and calls *A. tortuosa*, and takes the opportunity of reviewing the family. This species is, however, common in the Mediterranean, and is no doubt the *Serialaria semiconvoluta* of authors on the Mediterranean fauna, which has, however, as yet been but imperfectly and not always correctly described. The fact of the cells being biserial has led one Australian author to form a new genus for the species, but the growth is the same with the Mediterranean and several other species, which, however, varies much in the length of the internodes, so that one European writer has, in manuscript, called a variety similar to the Australian one, *Serialaria distans*.

"Mr. Woods has not given the size of his forms, which is important, we believe the variety in the Australian seas has much larger growth than the Mediterranean one. Although his paper is founded on a mistake Mr. Woods has put together a great deal of information on the family which will be of use to workers in Australia, where the literature is not so easily obtainable.

"Mr. Woods very wisely gives a figure of what he considered a new species, and it would be a great benefit if other authors would follow him in this, for several Australian and New Zealand workers have lately been giving descriptions without plates, and thus names have been created, to a large extent, for forms which the descriptions (in not a few cases imperfect) will not enable others to recognise."

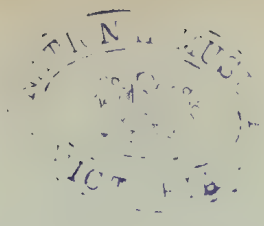
A plea is put up in the *Australasian* for the Iguana—the great lizard. The animals are well known to residents of the bush, and have a most formidable appearance. From this cause, perhaps, and because it occasionally enters hen-roosts and steals young poultry, the poor reptile is unmercifully persecuted and put to death. A correspondent of the paper named calls attention to the fact that the Iguana is really useful, as it destroys thousands of young rabbits that would otherwise prove intolerable nuisances. In addition to this the editor remarks that the same animal is an uncompromising foe to snakes, which it is suggested ought also to obtain for it some protection from the human species.

That a fly should prey upon his sworn enemy the spider appears at first sight highly improbable. Such, however, does sometimes happen; and one species of fly—a very large one, by the way—actually lives upon and feeds its young with prey of the spider family. The insect alluded to is, we believe, popularly termed the "Mason Fly." It is of handsome appearance, something like an overgrown English wasp or hornet. Its abdomen is striped with black and orange-colored bands. Its wings, often dark, are fringed with the same lively tint. It is called the mason fly from the habit it has of building up its nests of mud tempered to the consistency of mortar. These nests are essentially curiosities. At first the fly deposits a layer of earth, it then lays a certain quantity of eggs, then another layer of earth, and then, strange to say, it brings home a number of small spiders, which are so stung that they are for a time paralysed—not quite killed. These being covered with earth also remain living until they are preyed upon and devoured by the newly-hatched offspring of the fly. Nor is it small spiders alone which the mason fly attacks. We were passing through the St. Kilda Park some years ago, and saw one of them making a vigorous onslaught upon a large tarantula. The latter was powerless, as his enemy pounced upon him from above, falling each time upon the spider's back and tearing it with its powerful mandibles. After witnessing the fight for some time we drove the fly away. For a little while it seemed rather doubtful whether we ourselves should not be attacked, as the insect flew round us in gradually-lessening circles, to all appearance with fiercely hostile intentions. By dint of

flourishing an umbrella, however, we drove it off and away from the spider. In a few moments it returned to its former adversary, now almost powerless. We drove away the fly three or four times, and at last lost sight of it completely, as it had flown off to a distance of some twenty or thirty yards. We stood watching the tarantula for some minutes, when, turning round, we saw the mason-fly on the ground beside us. Again we drove it away, and then watched the result. The cunning insect had actually flown off to the before-mentioned distance, and then, in order to regain its prey, had alighted in a trench by the road-side, crawling along it unperceived until reaching the desired spot, whereat it stopped prepared to dart out as soon as the coast was clear. We repeated the experiment again and again, always with the same result. It may be interesting to know whether any other of our readers have ever noticed conduct of the same kind. Was it instinct or reason?

In December last a goodly number of our State School Teachers submitted to a voluntary examination in several branches of science. We hail this as a proof of the love of science, and a good augury for the extensive dissemination of scientific knowledge, and hope that before long some scientific attainments outside the three R's will be an indispensable pre-requisite to the granting of teachers' certificates. The syllabus at present embraces the following subjects: Physiology, Botany, Geology, and Mineralogy; Magnetism and Electricity; Acoustics, Light, and Heat; Mechanics and Hydrostatics; Chemistry and Metallurgy;—certainly a well-selected list, but we sincerely hope that Zoology will be added before the next examination. The text-books recommended in the science circular are written by such men as Huxley, Balfour, Lyell, Todhunter, and Roscoe, which is a sufficient guarantee of their excellence, and most of them can be got for a few shillings. In looking over the examination papers, it appears to us that the botanical paper is rather too elementary. We think that a paper like that set for the students of the training school would have been more suitable; but, perhaps, as this was the first examination of the kind, the department wisely decided to give every encouragement by means of simplicity.

Young naturalists, and especially microscopists, should as soon as possible cultivate and develop their tastes for drawing, and take as many notes as possible. It is quite a mistake made by many tyros to think that because they are not sure a newly-found object is a novelty its discovery need not be noted. It is only by the practice of duly chronicling phenomena that the actual novelty of the same is likely to be discovered.



THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, MARCH, 1881.

VICTORIAN FERNS AND THEIR HABITATS.

By C. FRENCH.

[Read before the Field Naturalists' Club of Victoria November, 1880.]

PART III.

Davallia—(SMITH).

Rhizome creeping; often covered with soft scales, or setæ. Fronds compound. Sori globular, or slightly elongated; terminating veins close under, or at a little distance from the margin.

Davallia dubia—(ROBT. BROWN)—(The Native Hare-foot).—This well-known species is to be found growing in nearly all forest land in mountainous districts throughout the colony. As a decorative fern for dwarf work in artificial fern gullies it has few equals, the fronds being of a beautiful bright green color and very graceful in appearance. The rhizome is creeping, and in form is not unlike the foot of a hare, hence its common name. In the districts of Macedon, Fernshawe, Arthur's Seat, Grampians, &c., this species may be found growing in the greatest luxuriance, and, being of easy culture and easily removed, it is in great demand for out-door ferneries, &c. To grow this properly it requires strong vegetable loam and plenty of drainage, and it will thrive on less water than most other species. It should be planted shallow in the soil (which should be well hardened down) and the rhizomes should not be covered to any great depth; rather hold the plant firm in the soil by pegging down. It grows to the height of from three to six feet, and, according to Bentham and others, it is found in Queensland, New South Wales, and in Tasmania. A very handsome tessellated form (specimen exhibited) was shown at one of our meetings by Mr. C. Merton, of Messrs. L. Lang and Co., nurserymen, by whom it has been sent out. This should make a very useful plant for pot-culture, &c., for table decoration.

Lindsaea—(DRYANDER.)

Rhizome creeping, or shortly horizontal. Fronds pinnate, or compound, or, in species not Australian, undivided. Sori in a continuous or rarely interrupted line under the margin of the frond.

L. linearis—(SWARTZ).—This pretty little fern is well known to those who have collected plants in the neighborhood of Melbourne. In appearance it is not unlike the larger forms of *Asplenium Trichomanes*, but of course it is readily distinguished from the latter species upon closer inspection. In the sandy wastes of Caulfield, Brighton,

Oakleigh, &c., it is to be found growing in great luxuriance, and even on the parched sandhills of these districts it seems to remain unhurt by the severe drought of a Victorian summer. As a rule it does not seem to thrive well under artificial treatment; still, with a little extra care it can be grown into very fair specimens. It should be lifted at the close of summer in good-sized sods or clumps, as it does not bear separation as well as many other kinds. To grow it well the black sandy soil which can be procured from any of the swampy districts in the localities above-mentioned will be found the most suitable. It should be potted in a rather shallow pot, the soil well pressed down, kept shaded for some time after potting, and the pot should be well drained and have plenty of water during the growing season. This species is very remarkable, from the peculiar wiry-nature of the stipes, and the peculiar difference in the growth of the fertile and the sterile fronds. Height, from four to eighteen inches, and in stony forest land somewhat higher. Found, according to Bentham and Müller, in Queensland, New South Wales, Tasmania, South and Western Australia, also in New Zealand, New Caledonia, and Norfolk Island.

Adiantum—(LINNÆUS).

Rhizome creeping or tufted. Fronds compound or rarely simple. Sori marginal.

A. athiopicum—(LINNÆUS).—We now come to a very beautiful genus of ferns, and one which is a great favorite with fern collectors, whether professional or amateur, partly owing to their great beauty and graceful appearance, and partly because of the many uses which they can be put to in the way of floral and other decorations. In the present species we have perhaps one of the most useful of the whole genus, not excepting *A. Capillus veneris*, *A. farleyense*, *A. concinna*, and other elegant kinds. For bouquets, small vases, splash-work, &c., this species is invaluable, and being easily grown, it is largely cultivated by those interested in floriculture. In England we are told to seek for the maiden-hair ferns in dark ravines, by water-falls, and in dripping caverns, but this of course alludes to a different species, viz., *A. capillus veneris*, also a most cosmopolitan plant. So that there is no need to take the trouble to search out these sylvan places for our common maiden-hair, it being very common in most moist forest country throughout Victoria. It may be remarked that this fern is to be found generally growing near logs or fallen trees, often near banks of creeks or rivers; but in travelling a good deal in search of ferns I have never observed it growing in such situations as those described by fern collectors in England and elsewhere. To grow this species successfully plenty of good rich leaf mould should be used. The pot should be shallow and well drained. (Of course this treatment does not apply to many of the stronger-growing kinds, which require the treatment of more robust plants). A liberal supply of water is very essential, a little shade, and a constant attention to the keeping down of thrips, scale, and other noxious insects which attack ferns in common with other plants. The first indication of thrip is generally a discoloration of the frond, commencing on the under

portion and gradually spreading over the whole plant. In fern-growing this must be especially guarded against, and the means usually adopted are fumigation, which, however, must be conducted with great care, otherwise the fronds will become yellow and fall off. This is a most important matter to fern-growers, and is often neglected until too late. This species grows to the height of from six to eighteen inches, and is somewhat variable in form, the extra-Australian species being generally more slender than those from the Australian colonies. According to Bentham and others, this species is found in Queensland, New South Wales, Tasmania, South and Western Australia, also widely dispersed over the tropical and temperate regions of the Old World and Western America. *A. assimile*, of Swartz, is identical with this species.

A. formosum—(ROBT. BROWN).—A very fine and large growing species, somewhat rare in Victoria but common in some parts of Australia and in New Zealand. This is one of the best of all the genus for pot culture, and for exhibition purposes, and if well grown the fronds will occasionally attain a length of from three to four feet. This species is easily recognised by its beautiful shining black stipes and rachis, it being very prominent in this adiantum. To grow it well, a compost of good strong vegetable mould should be used, with an addition of a little well-decomposed cow manure. It should be well drained and watered, and have plenty (but not too much) pot room. I have not been fortunate enough to find this species myself, but, according to F. Müller, it has been found by him on the Broadrib and Snowy River, and, according to Bentham and others, also in New Zealand. Height from one to four feet.

A. hispidulum—(SWARTZ).—A very useful species, either for pot culture, artificial ferneries, or table decoration. This species, though said to be very common in some parts of New South Wales and Queensland, is rather rare in Victoria, being found, according to Bentham, by F. Müller at the Genoa river. I have never found it myself, so I cannot say in what positions it will be most likely to be found. In appearance this fern differs considerably from the majority of the other species of the genus, although they are very variable in form, ranging from the very delicately cut fronds of *A. gracillimum* to those of *A. reniforme*, the latter of which is of the plainest description, being simply a reniform or kidney-shaped frond varying from two to three inches in width. To grow this fern successfully a very shallow pot or pan should be used, with light leafy mould, and a good supply of water; and it also succeeds (like many other of the genus) in suspended baskets. It grows to the height of one to two feet, and is found, according to Bentham and others, in Queensland, New South Wales, and extends over tropical Africa, and Asia, the Pacific Islands, and New Zealand.

Hypolepis—(BERNHARDT).

Rhizome creeping. Fronds compound, usually large. Sori marginal, short in the sinus of the teeth of the pinnules.

H. tenuifolia—(BERNHARDT).—This is a very handsome (and in most parts of Victoria) a somewhat rare species. I find that in

bringing this species before you as a Victorian fern, I am treading on dangerous ground, as Bentham has not given "Victoria" as one of its habitats, and he and others have also remarked the very striking resemblance which it bears to fronds (in an advanced state of fructification) to *Polypodium rugulosum*. Mr. Bentham, however, justly remarks that an examination of the fruiting fronds of the two species will in most cases show the distinction. I have a specimen of both of them here this evening, and will, with your permission, point out the difference, which seems to me to be a very important one. To grow this fern well it should be planted rather shallow in the pot or pan, because the rhizomes, being very soft and creeping just below the surface, would be easily destroyed by being placed too deep in the pot. (This rule will also apply to many of the Davallias and other genera. As a fern for artificial gully purposes it is very useful, being of rapid growth and easy cultivation. Height, from four to five and even six feet. According to Bentham and Müeller, it is found in Queensland, New South Wales, also in the Malayan Archipelago, the South Pacific Islands, New Zealand, but not in Tasmania.

Cheilanthes—(SWARTZ).

Rhizome tufted or creeping. Fronds usually small, twice or thrice pinnate. Sori globular.

C. tenuifolia—(SWARTZ).—A very pretty and interesting little fern found growing plentifully amongst rocks, principally of basaltic formation, throughout the colony. This species, which is a general favourite, is very useful for Wardian cases, artificial rockeries, miniature water-falls, &c., &c. It is easily cultivated, and, when well grown makes a very compact and pretty pot plant. There are several forms of this species, which are constant and very distinct, some of which are quite large and smooth, and others small and very hirsute. In the mountainous parts of Victoria this fern may be found on nearly every rocky hill, and frequently in company with the well-known, and beautiful little fan-leaved spleenwort, *Asplenium flabellifolium*. To grow this species well, it should be put into a rather shallow pot with soil composed largely of the skinning of the soil from basaltic rocks and a little sharp sand. It will grow either in dry positions or in wet ones, and thus is a most accommodating little plant. According to Bentham and others this species is identical with *C. Sieberi* of Kunze, and is very cosmopolitan in its character, being found in Queensland, New South Wales, North Australia, South and Central Australia, Western Australia, Tasmania, also extending to Eastern India, &c., Asia, and the Malayan Archipelago. Height, from two to fifteen inches.

FAMILIES OF VICTORIAN COLEOPTERA, OR BEETLES.

BY W. H. WOOSTER.

[Member of the Microscopical Society of Victoria.]

When I began collecting beetles and other insects, about nine years ago. I would have been very glad of the means of classifying them, even if only in families, a collection being much more interesting when the specimens are arranged according to their affinities or natural relationships, though the specific names may not be known. I have since met with several others in the same condition: and now that "Field Naturalists' Clubs" are being formed in various parts of the country, and in New South Wales, which is sure to multiply the number of collectors and increase the general interest in the subject of Entomology, and as we have in the "*Southern Science Record*" (a serial which I hail with much pleasure) a cheap and accessible means of circulating this class of information amongst those who need it, I purpose giving in brief form, for easy reference, and the guidance of collectors in these colonies, the characters of the families of beetles as generally accepted by the leading entomologists of the day, adding a few notes on habits, habitats, &c. If deemed of sufficient interest, this series could be followed by some notes on the leading Victorian genera, or by the family characters of the other orders of insects. Were our insects as few in number as our ferns, which I am glad to see are taken up by my esteemed friend Mr. C. French, they could easily be dealt with in detail; but as they amount to several thousand species (I collected over 5,000 in a radius of ten miles at Narree Warren), it will be seen that some volumes would be needed to give detailed descriptions of all. Hence a bird's-eye view is all that it is proposed to give at present.

As some technical terms must be used which may not be familiar to some readers, it will no doubt save time and aid progress to give a list of definitions of such terms. Believing that the English language will yet become universal, I recommend the use of plain English terms, where sufficiently exact and explicit, in preference to the stilted technicalities which to many are so repulsive. For instance, I prefer such terms as head, foot, shank, thigh, and jaw, to *caput*, *tarsus*, *tibia*, *femur*, and *mandible*. Still the list will prove useful as explaining many terms that will be met with in consulting books on the subject.

Caput, head. *Ala*, plural *alæ*, wing. *Thorax* or *prothorax*, the middle section of an insect between the head and abdomen. *Abdomen*, the hindmost of the three main divisions of an insect. *Tarsus*, foot of one to five joints. *Tibia*, shank, between the foot and thigh. *Femur*, plural *femora*, thigh, the joint above the tibia. *Elytron*, plural *elytra*, wing-cases to protect the membranous wings. *Antennae*, the so-called horns, of from one to twelve, or even more, joints. *Trophi*, the mouth organs collectively. *Mandibles*, upper pair of jaws. *Maxillæ*, lower pair of jaws, which are weaker, and mostly have an outer and inner lobe, and a palpus of four joints to each. *Labrum*, upper lip.

Labium, lower lip, mostly furnished with a pair of two or three-jointed palpi. *Labial Palpi*, the feelers attached to the lower lip. *Maxillary Palpi*, those on the lower jaws. *Mentum*, the chin, a plate behind the lower lip, often embracing it at the sides. *Scutellum*, a small, generally triangular, plate, often seen between the base of the wing-cases. *Larva*, the first stage of insect life after being hatched from the egg, known as grub, maggot, caterpillar, &c. *Pupa*, the second stage of insect life, inactive and taking no food in beetles, butterflies, moths, bees, ants, &c., but active and feeding in cockroaches, grasshoppers, &c. *Imago*, the third and perfect stage in insect life, during which it propagates its species and dies. *Calcaria*, spurs. *Clavate*, clubbed. *Truncate*, as though the end were cut off. *Emarginate*, as if a piece were cut out. *Transverse*, wider than long. *Exserted*, standing out, not hidden. *Porrect*, projecting forwards. *Moniliform*, like a string of beads. *Filiform*, thread-like. *Pectinate*, comb-like.

Several species need microscopic dissection and examination to determine their family, but the great majority can, with a little practice, be placed in their family at a glance, when once the family characters are known; and the rest can be examined well enough with a pocket lens, without cutting them to pieces. But a little dissection in each family is strongly recommended. The classification followed (*i.e.*, in regard to the *characters* of the families, while the family *names* familiar to English entomologists have been retained) is that of Lacordaire, whose grand work on the Coleoptera, filling ten vols., was highly eulogized to me by the late Count Castelnau, a most enthusiastic entomologist, as being by far the best in the world.

CICINDELIDÆ.—*Shape*, oblong, a few being linear. *Head*, large, wider than *thorax*. *Eyes*, very large and prominent. *Antennæ*, eleven-jointed, long, filiform or cetaceous. *Jaws*, long, curved, with several strong teeth. *Lower jaws* of two lobes (Lacordaire says the inner one, "lobe interne," but this must be a printer's error), outer one two-jointed and like a *palpus*, inner one mostly with a movable claw. *Lower lip*, hidden by the broad chin. *Legs*, long and slender. *Fore-shanks*, not notched near the tip. *Feet*, five-jointed, long, and slender. *Fore-feet* of the males often dilated. *Abdomen*, of six or seven joints, penultimate joints often notched in the males.—These are the most active and voracious of all beetles, and are very fitly called Tiger Beetles. They generally frequent hot sandy districts, in the hot sunshine, though it appears doubtful whether any have yet been taken in Victoria. Some may yet be found in the Murray district. The majority are prettily spotted, while several are simply splendid. Nearly thirty Australian species have been named.*

CARABIDÆ.—This is described as a family containing a vast number of species (Masters' Catalogue of Aus. Coleop. giving nearly 900 named Australian species) of firm consistence, which may be recognised thus: *Shape*, oblong, seldom ovate, many of them being much flattened. *Feet*, with five joints, some of them in the fore feet mostly dilated in the males. *Fore-shanks*, generally notched externally near the hip. *Legs*, fit for running. *Abdomen*, of six joints.

* Several specimens of a "Cicindela" have lately been taken near the Gippsland Lakes entrance, like *Cicindela ipsilon*.—[E.D.]

Antennæ, with eleven joints, not clubbed, slender, and rather long. *Upper jaws*, moderate or strong, reaching beyond the lip, with few or no teeth, but hooked at the tip. *Lower jaws*, slender, the outer lobe of two joints like a palpus. *Chin*, emarginate, often with a tooth in centre of emargination.—These insects prey upon others, and are found under logs, stones, bark, &c., by day, whence they go out hunting at night. Some are found on flowers by day, which they visit for the sake of the insects that are searching for honey: and some very small ones I have taken only among moss. Only a few have metallic colors, the majority varying from black to reddish brown. They vary in size from 1-16th in. to $3\frac{1}{4}$ in. long, the longest Victorian species being about $2\frac{1}{2}$ inches.

DYTISCIDÆ.—*Shape*, oval, elliptical, or rounded; somewhat depressed. *Feet*, with five joints; the four hind feet made for swimming; the three basal joints of the fore feet in the males of the larger species being much dilated. *Head*, broad, deeply sunk in thorax. *Antennæ*, of eleven joints, generally very slender, and longish. *Upper jaws*, short and stout, with a strong tooth within. *Lower jaws*, with the outer lobe two-jointed and palpiform, their palpi about twice as long as the jaws. *Chin*, emarginate. *Abdomen*, of seven joints.—These also are beetles of prey, but they live in the water, and are the sharks amongst beetles, whether in the larval or perfect state. Masters gives about eighty species as Australian. They are of dark or dull colors, very firm consistence, and can fly as well as land beetles. Their length ranges from $\frac{1}{8}$ in. to $1\frac{1}{2}$ inches.

GYRINIDÆ.—*Shape*, ovate or elliptic, and much flattened. *Fore legs*, long and slender; the rest very short, broad, and flat for paddles. *Feet*, five-jointed, of peculiar form. Two pairs of *eyes*, one on upper and one on lower surface of head. *Antennæ*, in a cavity in front of the eyes, and very short; first joint minute; second very large and produced into an ear-like process; the rest, eight or nine, very short, and forming a fusiform mass. *Lower jaws*, mostly without the outer lobe, which, when present, is not two-jointed. *Abdomen*, of six joints.—These are the whirligigs of our streams and ponds, spinning on the surface, though they can dive very swiftly when they please, and also fly well. Masters names but fourteen species. They run from $\frac{1}{8}$ in. to $\frac{3}{4}$ in. long, and often have a greenish metallic tint. These also are of predacious habits.

HYDROPHILIDÆ (Palpicornes of Lacordaire, and also embracing the Helophoridæ and Spheridiidæ of Westwood). *Shape*, oblong, ovate, or nearly hemispherical. *Feet*, five-jointed. *Legs*, for swimming or creeping. *Antennæ*, short, of six to nine joints, ending in a club. *Max. palpi*, generally very long, in some twice as long as the antennæ. *Abdomen*, of five joints, rarely four, six, or seven.—The beetles of this family mostly live in water, but their habits are inactive, and they feed on decaying vegetable matters. Masters gives but twenty-two species. They are all black or dull, and vary from $\frac{1}{8}$ in. to $1\frac{1}{2}$ in. in length.

PAUSSIDÆ.—*Shape*, oblong, quadrate, depressed. *Head*, mostly triangular, and narrowed behind into a neck. *Antennæ*, two to ten-jointed, very stout, all but the first forming a large mass of variable

shape, our species having ten joints, very broad and flat. *Palpi*, often robust, *Wing-cases*, broader than the rest of the body, parallel at the sides, and truncate behind. *Legs*, short, strong, and compressed. *Feet*, with four or five joints. *Abdomen*, of four joints. — The members of this family are very rare and extremely curious, generally of a chocolate color, highly polished, and from $\frac{1}{4}$ to $\frac{1}{2}$ in. long. When caught, they are apt to discharge a yellowish smoke from behind with a crepitating noise, which leaves a long lasting stain on the skin or nail. Verreaux says that some reside in ant's nests, but I have never taken them except under stones and bark. They are very inactive. There are fourteen species in Masters' Catalogue.

STAPHYLINIDÆ or Brachelytra. *Shape*, long, narrow, depressed. *Wing-cases*, very short, leaving most of the abdomen uncovered. *Abdomen*, very movable, of six or seven joints. *Head*, often large. *Antennæ* of eleven joints, either moniliform or gradually thickened to the tip. *Feet*, with a variable number of joints, mostly five, the joints of the fore feet often dilated in the males. — This is a rather numerous family, there being about eighty Australian species named. They are scavengers, mostly delighting in filth, and vary from 1-16th in. to 1 in. in length. Some display pretty colors.

PSELAPHIDÆ (by Westwood made a sub-family of Staphylinidæ). *Body*, short and robust. *Wing-cases*, cover but half of abdomen, and are much broader than the thorax. *Feet*, of three joints, often with but one claw. *Max. palpi*, mostly very long, often as long as the antennæ. *Antennæ*, of from 1 to 11 joints, clubbed, sub-cylindric or moniliform. *Abdomen*, of five (very rarely six) joints. — These insects are all very small, 1-20th to $\frac{1}{4}$ in., but very interesting. Westwood says they are generally found in winter and spring in moss, and occasionally in the sweep-net on grass; but I have taken more under stones and bits of wood in damp places than in moss or grass, and a few under dead bark. Some are found in ant's nests. *Color*, mostly brown. About eighty species in Masters' Catalogue.

SCYDMENIDÆ. — Much like the Pselaphidæ; very small and rare. *Wing-cases*, quite cover the abdomen. *Feet*, five-jointed. *Legs*, long and slender. *Thighs*, thick. *Max. palpi*, very long; third joint large; fourth, small and sharp. *Thorax*, subglobose, broader than the head, narrower than the wing-cases, which are large and oval. *Antennæ*, eleven-jointed, mostly thickened gradually towards the tip. *Abdomen*, of six joints. These are found in moss, under stones, &c., and occasionally in ants' nests. Masters gives sixteen species, but none as Victorian. I have, however, found representatives at Narree Warren.

SILPHIDÆ. *Shape*, from ovate to oblong, some much depressed. *Head*, often narrowed behind into a neck. *Antennæ*, of eleven (rarely ten) joints, clubbed. *Mouth*, prominent. *Jaws*, strong and exerted. *Lower jaws*, with two lobes, the inner one ending in a horny hook. *Feet*, with a variable number of joints. *Abdomen*, of six segments. This family includes the burying beetles of Europe and America. Ours are found about decaying animal matter. Masters names only four species for all Australia, but our largest is pretty common, about 1 in. long; another species is but $\frac{1}{4}$ in. in length. *Colors*, brown to black.

TRICHOPTERYGIDÆ.—The present family may be said to be very remarkable for the extremely minute size of the insects composing it, they appearing as mere living dots, and being perhaps the smallest of all beetles, though very interesting under the microscope.—*Shape*, elliptical, very convex. *Antennæ*, eleven-jointed, longish, slender, with three-jointed club. *Wing-cases*, cover the abdomen in some, in others not. *Wings*, very narrow, long, and ciliated. *Feet*, three-jointed, very slender, last very long. *Abdomen*, of five or six segments. —This family does not appear in Masters' Catalogue, but I have taken several specimens on window-panes.

SPHERIDÆ.—Lacordaire says that the *antennæ*, *upper lip*, and *hind lips* remind one of those of *Trichopterygida*, but that the other parts of the *mouth*, the *wings*, and the number of segments of the abdomen are constructed on a totally different plan, more analagous to the last genera of the *Anisotomides*, a sub-family of *Silphidæ*. There is but one genus, *Sphernis*, which I have not seen, and it does not appear to have been yet found in Australia.

SCAPHIDIDÆ.—*Shape*, oval. *Legs*, longish, slender. *Feet*, five-jointed. *Head*, deflexed. *Antennæ*, eleven-jointed, with a long club, not always well marked. *Abdomen*, conical at the end, of five, six, or seven joints, the first very large. *Upper lip*, emarginate.—Very few are over $\frac{1}{4}$ in., long. They inhabit rotting fungi, bones, dead bark, &c. Some are prettily spotted. Masters mentions only six species.

HISTERIDÆ.—*Shape*, oblong-square, or oblong-oval, some very flat, very hard, and highly polished. *Wing-cases*, truncate, not covering abdomen. *Antennæ*, short, elbowed at end of long basal joint, ten or eleven-jointed (very rarely eight), ending in a solid club of three joints. *Upper jaws*, stout and exerted. *Legs*, dentate. *Feet*, four-jointed. *Abdomen* five-jointed.—Found in decaying vegetable and animal matter, under dead bark, &c. Size 1-10th to $\frac{3}{4}$ in. *Color*, black or steel blue; some having red or pale spots. They feign death when alarmed. Twenty-four Australian species are named.

PHALACRIDÆ.—*Shape*, oval, convex. *Wing-cases*, cover all abdomen, which has five segments. *Antennæ*, eleven-jointed, last three form an abrupt club. *Feet*, five-jointed, fourth very minute, first three hairy below. *Claws*, with a tooth at base.—All I have seen of this family were about $\frac{1}{8}$ in. long, polished, pitch-brown, on flowers and plants. Masters names but one species.

NTIDULIDÆ.—*Shape*, oval to oblong. *Legs*, short. *Feet*, five-jointed, fourth very small and nodose; *hind feet* of some males only four-jointed. *Wing-cases*, very short and truncate in some, in others covering the abdomen, with a recurved margin. *Antennæ*, eleven (very rarely ten) jointed, last two or three a club. *Lower jaws*, nearly always have but one lobe.—They frequent flowers, bark, bones, &c., and some are often found in loaves of bread. Their *colors* are mostly obscure, though some have metallic tints. Scarcely any exceed $\frac{1}{4}$ in. in length. Thirty Australian species are known.

TROGOSTIDÆ.—*Shape*, oblong, much depressed, often scaly. *Wing-cases*, cover abdomen. *Legs*, short. *Feet*, five-jointed, first very small. *Antennæ*, eleven (very rarely ten) jointed, the last three mostly form-

ing a lax, dentate, or perfoliate club. *Lower jaws*, with two lobes, the inner often very small. *Abdomen*, of five joints. These are mostly found under bark or on plants; *color*, brown or blackish, scales often whitish. They vary in size from $\frac{1}{8}$ to $\frac{1}{2}$ in., and are sluggish in movement. Masters gives ten species.

A TRIP TO THE MOUNTAINS.

BY DR. T. P. LUCAS.

[Read before the Field Naturalists' Club of Victoria, February, 1880.]

Life is short—commercial competition and the race for advance are keen—the city is hot and dry—the dust is almost enough to choke you,—so let us away to the hills, where pure oxygen invigorates the soul, and where mountain ozone purifies the blood and restores healthy vitality.

For once in your life rise early; pack as little as possible, but simply what is absolutely necessary. Do justice to a substantial breakfast and, by a few minutes before 8 a.m., take your ticket at Cobb and Co.'s office in Bourke street. If you are poor, and limited for time, take it for Healesville or Fernshaw: if time and means are of no account, take a return to Marysville. If possible secure the box-seat: It is 8 punctual. The mails are handed in and away we start, nothing loath to leave behind the less-favored crowds just waking up to another day's anxieties and cares. Up Bourke street, over the Yarra, and past Kew, and we are, *bono facto*, in the country. As the Sun rises the painted-lady butterflies bid you welcome. Here at once is a study for Evolutionists. The Painted Lady—true type, and truly named,—is almost everywhere. In England the type is nearly half as large again, *Vanessa cardui*, but towards the Mediterranean and across to Japan it becomes smaller; and in Australia some one has turned the species into a Kershaw, because of an extra minute spot discovered by one of our own honored Society.

Leaving painted ladies and all such earthly vanities, we soon see the *Lunania Velleda*, a brown butterfly with purplish-blue eye-like spots on the borders of the wing; and (especially in the neighbourhood of Box Hill and Nunawading) an occasional *Pieris Harpalia* flies over our heads. "What a gem," cries the entomologist who sees this for the first time, and what a chase unless you capture him subtly. It is a large butterfly with white and black patches, and on the under surface most gaudy crimson: but while admiring or chasing this beautiful creature another attracts your attention, the upper surface smothered with velvety black on a cream-coloured ground. Surely this is another species! no; it is only the female, for these bright white fairies prefer to wed with black gins, and yet no new species

has as yet developed from the union. Possibly the fortunate observer may see a solitary specimen of the *Pieris Agarippe*, or even the rarer *P. Zeutonina*, but unless you can entice them to the blossom of the cherry or other fruit trees they are here high flyers and difficult of capture. Three or four rare species of blue butterflies prefer in this neighbourhood to dance around the topmost branches of the tall gum-trees, and as a rule can only be captured occasionally on a wet day and seeking shelter. I did not succeed in netting any.

As we pass on we notice several patches of heath-land, where earlier in the season, the beautiful green forester, and a number of *Geometers*, *Pyrales*, *Tortrices* and *Tineæ* love to sport, turning their wings to the sun as if to pray him to paint them yet more gaudy. These little moths have been for the most part left out in the cold by Australian collectors; but they are many of them gems, and, even to the microscopist, would form objects for instructive and beautiful slides.

But now we are coming into a mining country. The soil is becoming poorer; mines here and there dot the country—for the most part not worked at present: the mineral chiefly obtained in this part is antimony. It is impossible in a hurried trip to speak much of the geology of the country. The soil continuously changes, being here gravelly, there a white marl, and there a red clay, and, at places, a poor pipe-clay. The strata appears to belong chiefly to Silurian times, though, failing to find fossils, I could not be absolutely certain. It has been subjected to terrible upheaving, and to a considerable amount of denudation. Here it is vertical, there it is twisted and rolled completely over in anticlinal and synclinal, with the strike N. or N.E., and with a dip to the W. or N.W. The pipe-clays are probably washed from earlier deposits. In one narrow valley, bounded on almost every side, and reminding one of an immense gorge left by a land-slip, the features were most interesting—small hillocks, gentle sloping grass-covered mounds, and tipped by an iron-stained clayey soil, evidently, I believe, of post-tertiary or pleistocene period. I must allow I almost coveted this patch for my selection, but I was too late. Passing over hill and dale we at length reached Lilydale, 24 miles from town—a dull little place, where one hour was allowed to refresh the inner man. Large vineyards were studded here and there, and it is evident that Lilydale intends to make something out of colonial wine.

The road is now rougher,—we are approaching the mountains. Less wood is taken in here and there: patches of trees have been rung, and stand monuments of the destructive designs of man. Many of the trees here begin to show evidences of bush-fires black, charred, yet many of them covered with verdant foliage: and here again is the evidence of design. In England, where bush-fires are unknown, the trees are *Dicotyledons* or *Exogens*: they grow by adding a ring of wood outside the trunk and a thin layer of bark within the bark. This addition takes place annually, so that the age of the tree may be ascertained by counting the rings. The bark is thin, and the sap ascends chiefly in the cambium cells, between the wood and the bark. Fire such trees and they certainly die. In

Australia the bush is subject to fires, and so the larger number of trees are *Endogens* or *Monocotyledons*. The bark is thicker, the new wood grows inside, and the tree is formed of separate bundles of woody fibre, the sap being more generally diffused; and so, a fire which scorches the outside bark does not necessarily kill the tree. And again we note design. Reason and instinct are both the issues of certain forces at work in the brain. Reason is the issue of such forces directed by the will of the creature. Instinct is the result of forces playing in obedience to another will or law, independent of the will of the individual; the cause occurs without the creature's option: the effect, unless parried—as sometimes, in man, by reason—makes the creature its servile administrator. And as we all know, moths form, to a large extent, the food of many birds. To secure the safety of a competency sufficient to perpetuate the species, design is necessary. As noted, many of the trees in these primitive forests are naturally charred: hence they act as protective refuge for a number of species of black moths, notably *Camptogramma anthracinata* and a rarer and larger species. Many insects are rare until their habits are known. I had only obtained single specimens of this black velvety moth by attacking burnt logs, &c., until one night, with a lantern, I took refuge during a shower of rain in the centre of a burnt-out hollow tree. The light was too attractive: numbers of moths were disturbed, and as they flew out I captured about a dozen of this beautiful species.

But we are nearing the mountains. Small flocks of the scarlet-crested or gang-gang cockatoo pass screaming through the wood: while the more common and more noisy Pennant's lorikeet, or particularly known Red Lory plagues you to try a shot. The Sulphur-crested white Cockatoo, the brilliant King Lory, the impudent little musky Lorikeet, the swift-flying Lorikeet in flocks of a couple of hundred—all of them travellers (for this species is migratory), and occasional specimens of the chaste chestnut-shouldered grass parrot remind us that we are in sub-tropical Australia. Large fungus-growths press for protection to the trees—these I believe, when dried and cut form a very fair substitute for cork in lining insect-cabinet drawers: at all events I brought a huge specimen home, and intend to test its quality.

As the coach passes on, woe to the unfortunate snake lying in the road to enjoy the heat of the Sun. Many are thus run over, the drivers, of course, always cautiously avoiding them, lest the wheels might be venomous and defiled. I am not prepared to satisfy the snake collector's curiosity by a scientific *resume* of all the species in the mountains. Everywhere you go, it is the old cry, "Mind the snakes." Tiger-snakes and black snakes abound. One young man who knew that I was collecting natural objects took a small tin box out of his trousers pocket, and, opening it, imagine my consternation on seeing a friend about sixteen or eighteen inches long, coiled round and round, suddenly thrust up its head and dart in and out the tongue which so frightens the uninitiated. The boy simply thrust it back by means of the box-cover. It was about the size of a small whip-snake, but whether a poisonous species or not I cannot say. The youth believed it to be such, but was quite at home in knowing how to manage and handle such fry.

As we approach Healesville the landscape forms an object of study. Winding valleys, with small rivulets of crystal water, and bounded on either side by numerous small mountain cones. Viewed in the distance, these cones rise picturesquely one with another, each, as it were, striving to top its neighbour, and resembling those hills of ancient Greece piled up by the gods as Pelion on Ossa, and forming for them a staircase to the skies. No record remains of these heroes in Victoria, but as we rose to the clouds, we certainly, in more senses than the merely sensational, felt lifted towards heaven. The bracing air, the cool refreshing breeze, the stimulating aroma from the *Eucalypti*, the grandeur of the view, and the solemn silence of those everlasting hills formed a picture which called forth contemplation and delight. As we linger in pleasant meditation we are somewhat puzzled with the lights and shades: often the tops of the hills would be dark purplish green, and their sides or bases bright sunshine; or the whole mountain would be tinted with golden light, relieved by dark shades on the side. In vain we endeavoured to account for the phenomena by the laws of perspective: the hills simply refused to cast their shadows. At length the mystery was solved,—the key-note was most simple: the shadows were daguerreotypes of slowly-passing clouds. All besides was sunshine and glory.

But now, having crossed the Upper Yarra, and one or two of its tributary valleys, we are approaching Healesville, where, with plenty for reflection, and a bounteous table for physical gratification, we leave you all for a pleasant night's sleep, preparatory to a collecting tour on the morrow.

Correspondence.

THE "HEPIALUS," OR SWIFT-MOTH.

To the Editor of the SOUTHERN SCIENCE RECORD.

SIR,—Amongst the exhibits at our February meeting was one by Mr. Dattari, of a peculiar branching growth from the grub of the *Hepialus* or swift-moth, which the report described as of a fungoid nature. To this report Mr. Dattari has thought fit to take exception, by writing to the morning papers "correcting" the statement; but before so positively "correcting" it, I think it would have been judicious for him to have obtained more information on the subject. I have Professor McCoy's letter addressed to Mr. Dattari, confirming the opinion of the meeting, that the growth is fungoid; but the specimen is certainly a most unique one. The branching is probably attributable to some insect having attacked it in its early stages of development.

I am Sir, yours, &c.,

D. BEST,

Hon. Sec. F.N.C., of Victoria.

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALIST'S CLUB OF VICTORIA.

The usual monthly meeting of the above Club was held at the Club Rooms, Temperance Hall, Russell street, on Monday, the 14th ulto., at which there was the usual average attendance of members. Mr. T. A. F. Leith occupied the chair.

The minutes of the previous meeting having been read and confirmed, the following gentlemen were nominated as members:—J. Aitken, Wooriwyrite; Dr. Clarke, Emerald Hill; Dr. Schleicher, Collins street; F. Tate, Walsh street; W. J. Browncombe, Richmond; R. H. Nancarrow, Neilsborough; C. Troedel, Collins street.

The following papers were promised:—Continuation of description of Victorian Ferns, by C. French; continuation of description of Trip to Healesville, by Dr. Lucas; on the Black Fish, by F. J. Williams; description of green Sea-weeds of Victoria, by H. Watts; on the Lepidoptera of Japan, by F. C. Christy; continuation of paper on Dogs, by T. A. F. Leith; continuation of description of Victorian Longicorn Beetles, by D. Best.

Dr. T. P. Lucas read the first part of his description of a trip to Healesville, detailing the features of the country, and the entomological specimens to be found there.

A paper by Mr. F. J. Williams, on the Lyre Bird, or Native Pheasant (*Manuro superba*), followed, in which an interesting description of the habits of the bird was given. The mode of egg-laying, the manner of protecting its young, the peculiar movements of the male bird, and the facility with which it imitates the notes of other birds (which has caused it to receive the name of "mocking bird," were intelligently dwelt upon by the writer of the paper.

Mr. Luehmann concluded his description of Victorian Eucalypti, illustrating it, as previously, by specimens of the leaves, fruit, and flowers.

The usual *conversazione* and exhibition of specimens followed, amongst which were many objects of peculiar and special interest, notably a curious branching form of fungoid growth from the grub of the *Hepiatus*, or large brown swift-moth, taken at Whisky Head, near Daylesford; and 20 species of *Buprestidæ*, by Mr. Dattari. There was also exhibited by Miss Guilfoyle a fine collection of salt-water leeches, fish, lizards, crab, poison and silver-banded fish from New Guinea, fish from Amboyne, fish from Solomon Island, leopard-fish from New Hebrides, and cow-fish from Fiji and Solomon Island. Mr. J. E. Dixon exhibited ten species of *Coleoptera*; and other members contributed as under:—Specimens of *Polyzoa*, recently collected at Queenscliffe by Mr. H. Watts; specimens of *Coleoptera*, *Lepidoptera*, and *Orthoptera*, recently taken in Gippsland, by J. Andrews; specimens of various families of *Coleoptera*, from Transvaal and Cape Coast-Castle, by C. French; 44 species of *Coleoptera*, by O. A. Sayce; and specimens of Victorian Longicorn Beetles, by D. Best.

A very enjoyable, instructive, and pleasant meeting was then brought to a close.

MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held a very interesting meeting on Thursday, 24th February last. There was a large attendance of members and their friends. The Rev. J. J. Halley occupied the chair.

The Secretary acknowledged the receipt of the *Journal of the Royal Microscopical Society* for December, 1880, the two latest parts of the Proceedings of the Linnean Society of New South Wales, the Proceedings of the Royal Society of Adelaide for 1880, two important papers recently contributed by Professor Ralph Tate, and the Report of the Pharmaceutical Society of Victoria.

Mr. J. G. Melvin was elected a member of the Society.

Mr. Barnard read a note on a simple method, invented by himself, of cleaning used slides and covers by the application of a solution consisting of methylated spirits and *liquor potassæ* in certain proportions.

Mr. Wm. M. Bale read notes on Balsam and Dry Mounting, offering some valuable suggestions how to obviate certain difficulties in the various processes adopted, such as vacuum bubble, dew, or deposit on the inside of covers of dry mounts, &c. This paper was warmly discussed, but the opinion generally expressed was that Mr. Bale's suggestions were very valuable.

Mr. Barnard read a paper on Microscopical Examination of Victorian Woods, and exhibited a very fine series of slides of sections in three directions of Victorian woods, which were much admired. These were presented by Mr. Barnard for the Society's cabinet.

Mr. C. R. Blackett, on behalf of Mr. Waterhouse, Curator of the Adelaide Museum, presented specimens of an insect that had been erroneously described as the cause of red-rust in wheat. The insect was unknown, and is probably new to science.

THE FIELD NATURALISTS' CLUB OF SYDNEY.

The inaugural meeting of this Club was held on Friday, the 11th ult., at the Technical College, School of Arts, Sydney. Dr. Thomas Dixon occupied the chair. Rules founded on those of the Victorian Field Naturalists' Club were adopted, and the election of office-bearers was postponed to next meeting, the meetings of the Club being fixed for the first Friday in each month, the place of meeting decided upon being the School of Arts. The field-days are yet to be fixed. An excursion, however, was arranged for the 19th ult., upon which occasion a number of the members assembled and went by 'bus to Bondi Bay, an ocean beach, and afterwards to the cliffs on the northern side of the Bay. A "dyke" which outcrops on the cliff was carefully examined, a large quarry much facilitating the inspection, and one of the party brought away samples which were said to contain gold: the presence of iron is strongly marked, and the "dyke" reaches some distance into the ocean. On some flat rocks a few yards further were found some curious and quaint etchings or carvings, principally of fish, one of them about twelve feet long. They were supposed to be aboriginal drawings traced on the stone by a shallow groove. It was proposed to visit the locality on a future occasion. On the return trip

some of the party devoted a brief space of time to the examination of an old native camp, during which they unearthed some bones. The members spent a pleasant day, and the Club is expected to increase in numbers and utility.

THE FIELD NATURALISTS' CLUB OF DUNEDIN (N.Z.)

For the following Report of an Excursion of the above Club, we are indebted to a late issue of the *Otago Daily Times* :—

“On Saturday afternoon the members of the Field Club made an excursion to Tomahawk Lagoon, the difficulty of getting to Sandymount within reasonable time having precluded the excursion to that district. The locality chosen constitutes an excellent collecting-ground for marsh and aquatic plants, of which several species were gathered. The most interesting of these is a splendid water-plant, *Ruppia maritima*, whose mode of fertilisation was explained. The staminate and pistillate flowers are produced on long stalks, coming up from the bottom of the water. The former do not expand until they have been lifted quite out of the water, when the anthers rupture and scatter out the fine dry pollen, which is readily blown about by every breath of wind. The pistillate flowers are in like manner lifted above the surface, so that they become fertilised by the wind-blown pollen. As soon, however, as this has taken place their stalk contracts into a short corkscrew-like spiral, thus pulling the flowers to the bottom of the water, where they ripen their seeds with comparative immunity from danger. Specimens of the plant in all stages of the flowering process were obtained. Near the head of the lagoon a halt was made for the purpose of naming plants and transacting some business. Mr. S. Fulton was elected acting treasurer of the Club, and it was resolved to hold an indoor meeting shortly for the interchange of specimens, and for the starting of type-collections of local plants and animals. It is intended to place these collections in cases in one of the rooms in the Museum, the use of which was kindly promised by Professor Parker at the beginning of the session. Members will be able to consult these collections and compare them with their own. The next excursion was fixed for Saturday, 5th March, to the gully between Pine Hill and Mount Cargill, an excellent locality for the cryptogamic botanist.”

ANNUAL CONVERSAZIONE OF THE F.N.C. OF VICTORIA.

We have much pleasure in announcing that the first annual *conversazione* of the Field Naturalists' Club of Victoria has been fixed for Tuesday, 17th May, which will doubtless be a great success. The hearty co-operation of all members of the Club has been invited; and, as most of them are active collectors, they will be enabled to send not only general collections of the various branches of Natural History, but many objects of special interest. In our next we anticipate being in a position to give some particulars of the programme, which it is expected will include an address from the President, Professor McCoy, and also several short popular lectures, bearing upon the various exhibits, from some of the members of the Club.

THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, APRIL, 1881.

VICTORIAN FERNS AND THEIR HABITATS
By C. FRENCH.



PART IV.

Pteris—(LINNÆUS).

Rhizome short and thick, or creeping. Fronds usually large and compound. Sori linear. Spore-cases inserted on the frond under the indusium.

Pteris falcata—(ROBT. BROWN).—This is a very handsome species, of a somewhat peculiar form, and not uncommon in the fern gullies throughout the colony. In the shady creeks and gullies of the Dandenong, Gippsland, and other ranges, this species grows in great luxuriance, being generally found not in the beds of the creeks but amongst dense scrubs of Pomaderris or Native Hazel. The soil most suitable for it is deep rich decomposed vegetable matter. It should be planted rather shallow if in pots, but for artificial purposes generally pans will suit it best. It is very useful for growing amongst rocks in cool ferneries, also on embankments in artificial fern gullies. To grow it successfully it should be planted in large patches, so that the rhizomes which are a very little depth in the soil may support themselves. This species, from the very prominent contrast between the fruiting and non-fruiting parts of the fronds, is largely used in making fern pictures, and other fancy work. As an exhibition plant it is of little value. Height from 6 to 20 inches. This fern is also known by the names of *Pellaea falcata*, *P. seticaulis*, and *Platyloma falcatum*. Found, according to Bentham and others, in Queensland, New South Wales, Tasmania, also in East India, the Malayan Archipelago, and New Zealand.

Pteris longifolia—(LINNÆUS).—A very handsome, and in Victoria a somewhat rare species: in form it is peculiar, being not unlike some of the species of the genus *Lomaria*. This fern, if well grown, makes a very good plant for exhibition purposes, being easily cultivated, and it makes a good contrast when placed along with other ferns. The soil most suitable for it is a rich chocolate vegetable mould, with a little sharp sand added, as, in pot culture generally, too much care cannot be taken in potting with a compost which will not bind too closely. If it is to be grown in pots, plenty of drainage should be used, and it must not be placed deep in the soil. This species grows to the height of about 3 feet. I have never been fortunate

enough to find this fern myself, but, according to Bentham, it has been found by F. Müller on the Mitchell and Buchan rivers, East Gippsland: it is also found in Queensland and New South Wales, and is widely spread over the tropical and temperate regions of the globe.

Pteris umbrosa—(ROBT. BROWN).—A very beautiful species of this fine and interesting genus. As a pot plant, or for decorative purposes in a cool greenhouse or out-door fernery, it is particularly valuable, the color of the fronds when well grown being of a beautiful light green. To grow it luxuriantly it should be potted in good strong vegetable soil, with plenty of drainage, an abundance of clean water, and ample pot-room, and if grown in small pots (say 6 or 7 inch) it makes a very ornamental plant for the decoration of the dinner-table. If well grown it grows to the height of about 3 feet or even more. I have never found this species myself; but, according to Bentham, it has been found by F. Müller at the Genoa river, East Gippsland, also by various collectors in Queensland, and New South Wales.

Pteris tremula—(ROBT. BROWN).—A very showy and useful species, either for artificial ferneries or fern gullies. This fern is found growing very common in the deep gullies of the Dandenong, Gippsland, and other mountain districts. I remember to have seen on a recent trip to the neighbourhood of the Leng Leng, in the Drouin district, this fern growing in great luxuriance. I may assert, without being accused of exaggeration, that some of the fronds which I measured were not less than 6 feet in length. The color of the fronds is a bright green, and they will stand the effects of gas-light better than many others, even of the commoner species. This species will grow in almost any ordinary strong soil if well watered, and it is also one of the easiest-raised species. As a plant for drying in Albums, splash work, fern pictures, &c., it is much prized, owing principally to the very distinct character of the fructification, which is also the case with many others of this genus. According to Bentham and others, it is found in Queensland and in New South Wales, Tasmania, also in Norfolk and Fiji Island, and in New Zealand.

Pteris aquilina—(LINNÆUS).—*Variety esculenta*—(HOOKER).—A very common form of the well-known *P. aquilina*, or brake fern of the British country folks. It will be scarcely necessary for me to attempt any description of this species, as it is known to all of you. I have often heard it remarked that its presence is indicative of poor soil, but I am not inclined to accept this verdict altogether: of course you have observed that the sandy wastes bordering on the coast are very often covered with it, but on the other hand you will have noticed that in the rich soil of our forest lands it grows much more luxuriant than when near the sea-coast; so that we may safely conclude it to be equally at home on any soil, and in any position, whether exposed or otherwise. On the exposed parts of our coast-line this species becomes stunted and dwarfed, but in the shady recesses of our mountain districts we find it attaining a height of five or six feet: indeed Mr. Spruce, the celebrated South American traveller, mentions having seen specimens of it 14 feet high. This species, though common, is very useful, being used for bedding purposes for cattle, and also for thatching or roofing, and is mentioned in medical works as

being valuable in the treatment of certain diseases. It is very cosmopolitan in its character, being found, according to Bentham and others, in Queensland, New South Wales, South and Western Australia, Tasmania, also in some form or other in most tropical and temperate regions of the globe, the *var. esculenta* only in the Southern hemisphere. Mr. Bentham remarks that a few Australian specimens (from Portland, &c.,) come very near to the typical form.

Pteris incisa—(THUNBERG).—This is the well-known and beautiful Bat-winged Fern, commonly known to fern-collectors as *P. vespertilionis*. In the deep shady gullies of the Dandenong, Arthur's Seat, Gippsland, and other mountain districts throughout the colony this species will be found growing in great luxuriance, and it will be easily distinguished from any other species chiefly by its peculiar light green color and incised appearance of the fronds. It is very useful for artificial rock-work in fern gullies, but it must be kept moist, and should be planted very shallow in the soil, as the rhizomes, when in its native state, creep along just beneath the surface of the soil. It should be grown in strong decomposed mould, which should be well drained. As an exhibition plant it is fairly useful, but if used for covering pieces of tree-fern stem it makes a very pleasing object, and should be used in all kinds of artificial gully work. Those who make collections of dried ferns will find it a very good species for pressing, as it is easily dried, and keeps its color better than many other kinds. It is also a cosmopolitan species, being found, according to Bentham and others, in New South Wales, South Australia, and Tasmania, also spread over the tropical and Southern extra-tropical regions of the New and Old World. Height, from 1 to 6 feet.

Pteris comans—(FORSTER).—A very handsome and large-growing species found sparingly in the Dandenong, Gippsland, Otway, and other fern gullies. In appearance it somewhat resembles *P. tremula* but is readily distinguished from it upon close examination, being rather darker in color, more flaccid, and the fructification less distinct but as a rule darker than that of the latter species. This species is most useful for cultivation in the cool green-house and the artificial fernery, being of easy culture and rapid growth, and as a rule very hardy. As an exhibition plant it is of rather too rank a growth to successfully compete against more suitable kinds, still it makes an excellent specimen to place in a stand of hardy ferns. To grow it well it should be placed in a large pot (or, what is better, a deep pan), and the soil used should be strong but fibry, some chopped tree-fern stems being useful in mixing a compost for it. This species should be sought for on the banks of rapid creeks where all is dark, and where the rays of the Sun seldom penetrate. In a recent trip to some of the Gippsland fern-gullies several fine specimens were met with, the fronds of some measuring nearly five feet in length. I should mention that a constant supply of water is necessary to keep this fern in good healthy growth. According to Bentham and others it is found in Queensland, New South Wales, Tasmania, also in New Zealand and the Pacific Islands. This species, I may observe, is said to be identical with *Pteris endlicheriana*, but to a non-scientific person like myself it would appear to be a very distinct species.

Lomaria—(WILDENOW).

Rhizome creeping, or ascending into a short trunk. Fronds pinatifid, or simply pinnate. Sori in a continuous line on each side of the midrib between it and the margin. Segments of the fertile fronds under 1 inch long, about $1\frac{1}{2}$ lines broad.

Lomaria Patersonii—(SPRENGEL).—A somewhat singular species, commonly found in or near water-courses in our mountain gullies. The fronds, which are long and undivided, are of a dark sap-green color, and very crisp in texture. As a decorative plant it is little used, being simply useful as a contrast to some of the more ornamental species of the ferns. This genus is remarkable for the peculiar difference between the sterile and fertile fronds, the former being generally of a bright green, and the latter a darkish brown, which gives to the whole plant a somewhat rusty appearance; also for the singular bipinnate forms which some of the species assume in certain localities. In this species, however, the fronds are nearly, as I have before remarked, undivided; still I have frequently met with them forked at the apex. To grow this fern well it should be potted in decomposed vegetable soil and kept well watered and shaded; otherwise treated it soon becomes shabby: care should also be taken to provide against thrips, which attack this species very readily. It grows to the height of about from 6 to 12 inches. According to Bentham and others it is very widely distributed, being found in Queensland, New South Wales, Tasmania; also dispersed over East India, the Malayan Archipelago, the South Pacific Islands, and New Zealand.

Lomaria discolor—(WILDENOW).—This is a most robust, elegant, and useful species, being specially adapted for dwarf-work in artificial fern gullies, also for the general decoration of the dinner-table and at public festivities. In certain districts this species assumes two or three very singular forms, which invariably occur in the sterile fronds only. The first brought under notice was discovered by Mr. D. Boyle, of Nunawading, a very enthusiastic collector in times gone by. It was presented by him to the Botanic Garden about the year 1860, or soon after, and has since been known under the name of *L. discolor*, variety *bipinnatifida*. It was then considered rare, but since that time many have been found and exported to Europe and elsewhere, where they commanded much attention, and were disposed of at a high figure. The bipinnatifid forms are by no means confined to the Dandenong mountain district, several distinct forms having recently been found at Macedon, Gippsland, and elsewhere. To grow this species it simply requires strong soil and plenty of water at the roots. In a recent ramble I saw a large number of the common type of this fern, which had very slender stems of from 2 to 3 feet in height: and these can be obtained in quantity within a mile or so of the Waterloo Station on the Gippsland line of railway. Height, from 1 to 3 feet. This species is found, according to Bentham and others, in Queensland, New South Wales, South Australia, and Tasmania, also in New Zealand and in Norfolk Island.



LONGICORN BEETLES OF VICTORIA.

By D. BEST.

PART IV.

Of all our Longicorn Beetles none, I think, possess greater interest for the collector than the genus *Hesthesis*. Marked as are the bodies of all the known Victorian species, numbering probably about six, to resemble the *Hymenoptera*, or wasp family, and often, by a beginner at all events, mistaken for them, it seems, at first sight, apparent that this resemblance has been intended by the Creator as a protection against some of their enemies. But as their principal and natural enemies, birds, are also destroyers of wasps, how this similarity protects them is a question I am unable to solve. Another peculiarity they possess in common with the *Agapete*, an equally interesting genus, is in having very short elytra, or wing-cases, extending no further than about one-fourth of the length of the wings themselves, to which they can, of course, afford but very little protection. Whether this deficiency of protection is a source of weakness to the wings I cannot positively say, but my experience goes to prove that these insects—that is, the *Hesthesis*—are by no means powerful or quick in their flight, the whole of my specimens having been quietly picked off shrubs or dry twigs, without the slightest attempt on their part to escape. I regret I have never been able to satisfy myself as to the wood in which either of these families breed, but I am disposed to favor the ti-tree, *Leptospermum scoparium*, plentiful about Caulfield, Mordialloc, Pakenham, &c., for the *Hesthesis*, and for the *Agapete* that almost inseparable companion of our river banks, the common wattle, *Acacia molissima*.

31. *Hesthesis plorator*—(PASCOE).—This is by far the commonest of the three species I possess, and may be taken in numbers on the *Leptospermum scoparium* during October to December, and sometimes January, at the above-named and many other places, its distribution being very wide, extending, to my own knowledge, as far North as Mount Macedon. It is distinguishable by having a black body with three narrow whitish-colored rings round it. The male and female are about the same length, averaging eight to nine lines, but the male is generally rather narrower, has longer antennæ, slightly exceeding its own length, and which are apparently of a uniform thickness, whilst those of the female are only about two thirds its length, and are more of a club shape, increasing in thickness towards the tips. In both sexes the antennæ and thorax are black, but the elytra are of a yellowish and dark brown shade, the head being black, with a whitish mark immediately in front just below the eyes.

32. *Hesthesis cingulata*—(KIRBY).—Is a much larger species than the previous one, averaging fully 11 to 14 lines in length, and is more than proportionately broader. Has a whitish-colored body, with three broad yellowish rings; thorax, brown, with yellowish rings immediately where it joins the head and the body; antennæ black, joints of which are club-shaped, and from two-thirds to three-fourths the length of

the insect; in the male they are slightly longer. This species is also much rarer than *plorator*, but will often be found in the same localities and on the same shrub; and I have occasionally taken it on young gum-saplings and dried wattle-twigs. Season, October to January.

33. *Hesthesia* sp.—Of this I possess only two specimens, secured during last December in the vicinity of Doncaster, and although I think its natural food is the *Leptospermum scoparium*, &c., I found these two resting on a species of prickly and almost leafless shrub, of which I unfortunately do not know the name, and, having neglected to bring a piece with me, I have been unable since to obtain the information. This species differs materially from either of the other two, in having much longer and thicker antennæ, and an altogether more defined yellowish appearance on its upper parts. In length it slightly exceeds *plorator*, being 10 to 11 lines.

34. *Agapete carissima*—(NEWMAN, &c).—This is another of the short wing-case family, but differs altogether in color from the *Hesthesia*. The head and thorax are a brilliant red; meta-thorax, or second portion of the body, black, with a whitish hairy appearance at the sides; abdomen, light brown, becoming almost black towards the end. The elytra, which are of a lightish brown, are of a most delicate formation, and almost transparent. At their commencement they are the full width of the body, but gradually taper away towards the outer sides, and to half-way down the length of the insect, to a fine point. The antennæ are about the same length as the insect, are perfectly black and, with the exception of the terminal joint, of a uniform thickness. The months in which I have most generally found it are November to February, and in almost every instance resting on grass-tops or dried twigs. I recollect only in one instance securing a specimen flying, and then it was a very hot day; but although I think there can be little doubt that its movements are very limited, its range *appears* to be very extensive. I myself have only found it in the neighbourhood of Melbourne; but Mr. Masters, of Sydney, gives it in his catalogue as belonging to both New South Wales and South Australia. Length from head to tip of wings, 11 to 12 lines, with a width of about three.

35. *Agapete Kreusleri*—(PASCOR).—A much more common species than the foregoing, being taken in large numbers from off the low small dry twigs of the wattle during the months of January and February, and will sometimes be found as early as September, and as late as March. It is readily distinguishable from *carissima* by having a black thorax, but in other respects is very similar. Length from head to tip of wings, nine to ten lines; in width, about two.

We now come to a genus which, until quite recently, was esteemed as one of, if not absolutely, the rarest of our Longicorn Beetles: I allude to the *Peisarthrius*, of which only one species is so far known.

36. *Peisarthrius marginellus*—(HOPE).—In length the male is about nine lines, by two broad at the junction of the thorax. The color of the elytra is darkish brown at the edges, much lighter down the centre, with a dark band about half way down,—and the upper portions are very distinctly punctured. Head, brown; eyes, black;

antennæ, same length as the insect, and very beautifully pectinated, the joints being from three to four lines in length, and, when properly set, give the insect a most ornamental and beautiful appearance. The female differs from the male in being larger, 11 to 12 lines in length, by three in width; color, similar; antennæ, simple or serrated, and about two-thirds the length of insect. Within the last two years researches have proved this, at one time highly prized and valuable longicorn, to be one of the most common breeders in the common wattle (*Acacia molissima*), and it has been taken therefrom in large numbers. The reason I assign for its previous rarity is that, immediately on its emerging from the wood, it makes for the highest portions of the tree, and, being very tenacious in its hold, collectors have been unsuccessful in securing it by the ordinary method of shaking the branches over an umbrella, although I myself have, in this manner, been fortunate enough to take a few specimens. The more successful way is by cutting them out of the wood; but as it is evident that a collector, ignorant of the signs by which to detect the presence of the insect, or its caterpillar, might cut into dozens of branches without any reward for his trouble, I will, so far as I am able, describe them, and the manner in which it proceeds to develop itself, and propagate its species. The female, having been impregnated by the male, deposits its eggs on a green portion of the *Acacia*; these eggs quickly become hatched into small caterpillars, each one of which at once proceeds to fulfil its destiny by boring into the centre of a small branch, commencing, as a rule, at the outer end, down which it, by means of its powerful mandibles, gradually works its way, sometimes for a distance of two or three feet, and at last, being full grown (that is, about two inches in length, and in color almost white), encases itself in a portion of the hollow it has made, by stuffing both ends of a space the length of itself with small particles of the wood. There in due course it transforms itself into the pupa state, and at the proper season assumes its perfect shape, and bores its way out; many, however, will remain in the wood a considerable time before emerging. Now, it is the small hole made by the boring of the caterpillar into the wood that serves to discover its presence, and also the fact that, as it proceeds on its course, the wood behind it often gradually dies. With so many insects living on, and breeding in, the wattles, it is not to be wondered at that this tree is short-lived; and, as the progress of cultivation does not favor its re-production to any great extent, it might be fair matter for speculation as to whether those insects that frequent it would, in its absence, resort to any other, and, if so, to what?—probably another species of *Acacia*. I cannot help here expressing the great regret I feel at seeing the *Acacia molissima* so rapidly disappearing from the, at all events, immediate vicinity of Melbourne; and when I have occasionally, in my collecting tours, come across an erstwhile follower of Izaak Walton, but evidently lacking the honest old angler's finer feelings, in the act of ruthlessly cutting down a fine specimen—probably full of an infinite variety of insects in every stage of development,—for the sole purpose of possibly securing one or two of the grubs of the large grey moth, *Endoxyla* (which feed on the lower portion of the stem and roots), with which to tempt a bite from a stray black-fish, my thoughts towards him have, I can

assure you, been of a by no means peaceful nature. It must not, however, be supposed that by simply following the above directions the collector will, in every instance, be gratified by a *Peisarthrius*. It is first necessary he should know the proper months, which will, I believe, be found to be, say, January and February, and after carefully tracing the course of the caterpillar for some distance he may only be rewarded by a specimen of *Symphyletes*, which pursues a somewhat similar manner of procedure, or even by a common *Hebecerus*. Sometimes, also, after the expenditure of a great deal of patience and labour, he will find himself too late, the beetle having already taken its departure, or, worse still, be disgusted to discover that the caterpillar, after attaining almost its full growth, has succumbed to the deadly ichneumon fly (which insect, by the way, is one of the agriculturalist's best friends, as it destroys many such things as locusts, grasshoppers, &c.), whose eggs have been deposited in its body in its earlier stages of growth, and, having there fattened on it sufficiently long to arrive at maturity, bursts out, leaving nothing behind but the skin of its unfortunate supporter.

In connection with this explanation there is a matter which puzzles me, and which I should certainly wish to understand, and that is, what becomes of all the wood the caterpillar consumes or removes in its course; for, after following it for some distance, not a particle of wood (unless it has encased itself) will be found; and yet, if you cut off, say, about three inches containing the caterpillar, in a few hours you will find it has gnawed off hundreds of tiny bits, which it has filled in at each end of the hollow, and so rendered itself secure from attack.

FAMILIES OF COLEOPTERA, OR BEETLES.

BY W. H. WOOSTER.

[Member of the Microscopical Society of Victoria.]



PART II.

COLYDIDÆ.—*Shape*, oblong to linear, some depressed. *Jaws* and *palpi*, very short. *Antennæ*, with 11 or 10 joints, very rarely 8, in some gradually thicker to tip, but mostly ending in an abrupt club. *Feet*, four-jointed, simple. *Abdomen*, of five segments.—These are mostly brown or dull, very sluggish in movements, and found under bark or on old logs. There are about forty Australian species named. Their length runs from $\frac{1}{8}$ to $\frac{3}{4}$ in.

RHYSSODIDÆ.—*Chin*, very large, closing the mouth below, or nearly. *Head*, with a very narrow neck behind. *Antennæ*, eleven-jointed, filiform, granulous. *Feet*, five-jointed, simple, cylindrical. *Abdomen*, of six joints.—As I have not seen any of these, and as Lacordaire never gives the shape, size, and color amongst the family characters, I can say nothing on these points. They do not appear to have yet been found in Australia, though some have been taken as near as Java.

CUCULIDÆ.—*Shape*, oblong and very flat. *Antennæ*, eleven-jointed, filiform, or with a small club of three joints. Fore and middle legs, distant; hind legs contiguous. *Feet*, simple, five-jointed; some males have only four joints in the hind feet. *Abdomen*, of five segments. Masters names 16 species. They are mostly brown, reddish, or dull, and found under bark (some only under dead bark), on logs, and a few amongst scrub. Length, from $\frac{1}{2}$ to $\frac{3}{4}$ in.

CRYPTOPHAGIDÆ.—*Shape*, ovate or oblong, depressed. *Antennæ*, eleven-jointed, the last three a club. *Elytra*, entire. *Feet*, of five joints; very rarely of four joints in the males. *Abdomen*, five-jointed. *Chin*, narrowed and bisinuate in front. Lobes of lower *jaws*, coriaceous, inner one ending in a horny hook. *Labial palpi*, three-jointed. *Maxillary palpi*, four-jointed, all short. —Masters gives but one species of this family as Australian, and that from Sydney. They all appear to be small, from $\frac{1}{2}$ to $\frac{1}{4}$ in. long, and of obscure colors. I am not aware that I have ever taken any. Their name would indicate that some at least feed on *cryptogams*.

LATRIDIDÆ.—*Shape*, oblongish, narrowed in front. *Antennæ*, generally eleven-jointed, ending in a club of one, two, or three joints. *Feet*, three-jointed in both sexes, the end being entire. *Abdomen*, of five joints, the first much the longest. *Labial palpi*, of two or three joints. *Maxillary palpi*, four-jointed. —These are very small, from 1-16th to $\frac{1}{4}$ in. long, and brown in color. The thorax is narrower than the abdomen, and the head narrower than the thorax. Only two species appear in Masters' Catalogue, one from Tasmania and one from Queensland; but I have taken the island representative under bark and on windows at Narree Warren.

MYCETOPHAGIDÆ.—As I am not aware that I have seen any of this family, or that it has yet been taken in the colony (Masters' two species being both from Queensland), I can say nothing about their shape, size, or color; but their name leads one to expect them in fungoid growths. Westwood figures one of the typical genus as being oblong, and about equally rounded at both ends. It is about $\frac{1}{4}$ in. long. Lacordaire's chief characters are: *Antennæ*, eleven-jointed, with club of three (rarely two) joints. *Feet*, of four joints, the males having but three joints in the fore feet, rarely with apparently five joints in both sexes. *Abdomen*, of five joints, subequal. Lobes of lower *jaws* unarmed.

THORICTIDÆ.—*Antennæ*, eleven-jointed, ending in a club. *Prothorax*, very large. *Wing-cases*, short, entire. *Feet*, with five simple joints. *Abdomen*, of five joints, the first and last longest. —Like the last, this family is unknown to me, and indeed does not appear to have been yet found in Australia.

DERMESTIDÆ.—*Shape*, oval or oblong, thick. *Antennæ*, short, retractile, of 11 (very rarely eight or five) joints, clubbed. *Head*, sloping downwards, more or less retractile in the prothorax, which is mostly furrowed below to receive the antennæ. *Wing-cases*, cover abdomen. *Legs*, short. *Feet*, of five simple segments. *Abdomen*, five-jointed. —The larvæ of some of these, e.g., *Anthrenus muscorum*, are very destructive amongst collections of natural history, attacking anything, from insects to elephants. Another species attacks bacon;

Others are found on flowers and under bark; and some eat books and paper. Scarce any reach $\frac{1}{2}$ in. long, and their colors are obscure. Most of them are covered with velvety hair of various tints. There are 13 species given as Australian, though Masters does not give any as Victorian; but I have taken several species.

BYRRHIDÆ.—*Shape*, oval or rounded, very convex. *Legs*, perfectly contractile, *i.e.*, the feet can be laid on the shanks, these on the thighs, and these are lodged in cavities on under side of body when the insects are alarmed. *Feet*, of five simple joints. *Abdomen*, five-jointed. *Head*, entirely retractile in the thorax, and then invisible from below. *Antennæ*, 11, very rarely ten-jointed, mostly clubbed.—These are found on paths, among sand, &c., sometimes on bushes and a few under bark; and counterfeit death on the least alarm, when they look more like a pea or a pill than a beetle. Few exceed $\frac{1}{4}$ in. in length. The colors are dull. Ten species are given as Australian.

GEORYSSIDÆ.—*Antennæ*, nine-jointed, with club of three joints, inserted under the sides of the head, near the eyes. *Wing-cases*, entire. *Feet*, filiform, four-jointed. *Abdomen*, five-jointed.—This, again, is a small family (only two Australian species being known) of small insects, which I have not seen. Westwood says that the only one known to him was small, and often found under stones, in streams, or on damp ground.

PARNIDÆ.—*Shape*, oval or oblong, more or less convex. *Antennæ*, of variable form, short, generally of 11 joints. *Head*, small, retractile in the thorax. *Feet*, of five simple joints, last very large, with stout claws. *Abdomen*, of five or seven segments.—The members of this family are mostly found near or even in water, some on the under side of stones, &c., in creeks. *Length*, 1-10th to $\frac{1}{4}$ in. *Color*, dull; movements, slow. Seven Australian species are catalogued, though none are credited to Victoria; but I have found some.

HETEROCERIDÆ.—*Shape*, oblong. *Thorax*, much narrower than elytra. *Jaws*, robust, toothed, advanced. *Antennæ*, short, 11 joints, two basal joints large, rest gradually forming a club. *Wing-cases*, cover abdomen. *Feet*, four-jointed, simple; but Westwood says there is a fifth basal joint very small and oblique. *Legs*, broad, compressed, serrated. *Abdomen*, of five-joints. These are subaquatic, and about $\frac{1}{4}$ in. long. One species has been found in Queensland.

LUCANIDÆ—(Pectinicornes of Lacordaire).—*Shape*, oblong or oval, often robust. *Head*, large or very large. *Antennæ*, generally ten-jointed, the last three to seven joints forming a pectinated or subserrate club, mostly strongly elbowed at end of first joint, which is often very long. *Jaws*, often enormous in the males, in some as long as the body. *Feet*, five-jointed, with an appendage between the claws. *Abdomen*, of five segments.—This is a favorite family with many collectors, from the large size, strange jaw-development, and the brilliant colors of some of its species. The size varies from $\frac{3}{8}$ to 3 in., though our species are not longer than $1\frac{1}{2}$ in. They are found on eucalypts, under stones and logs, under dead bark, in rotten sapwood, at the roots of rotten oak-stumps, and sometimes flying at dusk. The males of our genus, *Lamprima*, have a curious plate on the fore shanks. About 40 species have been catalogued as Australian.

SCARABÆIDÆ—(Lamellicornes of Lacordaire).—*Shape*, oblong or oval, often very robust. *Antennæ*, short, not elbowed, of 7 to 11 joints, the first large, the last 3 to 7 movable, forming a leafy, sometimes fan-like, club. *Legs*, mostly stout; *forelegs*, generally dilated and toothed. *Feet*, five-jointed.—This family, whose several sub-families have been erected into separate families by W. S. Macleay and others, is one of the most extensive and important families of insects, and certainly contains the largest and some of the most beautiful beetles known. The members of its different tribes are very diverse in appearance, habits, and habitats. Some live in dung of different animals, others on the honey of flowers, others on green leaves; some are quite dull and without beauty, others simply gorgeous; some are quite plain in outline, others armed on head and thorax with enormous horns, simple or branched; some love the sunshine, while others appear only at night. They may be found on trees, bushes, and flowers, and under bark and stones. In size they range from $\frac{1}{2}$ to 4 inches, though none of our species reach much more than an inch. Masters gives over 450 species as Australian, and the total number in this family must approach 4,000 species. The males are distinguished by the horns spoken of in two of the tribes, by immense hind legs in another, in some species by a difference in color or pattern, and in other cases there appears to be no distinction.

BUPRESTIDÆ.—*Shape*, from linear to ovate-oblong, mostly depressed. *Head*, very short, buried to the eyes in the thorax. *Antennæ*, short, eleven-jointed, and serrated. *Wing-cases*, often narrowed and denticulate behind. *Legs*, short. *Feet*, five-jointed, the four first joints with membranous cushions. *Abdomen*, five-jointed.—Taken as a whole, this family is, without doubt, the most splendid family of beetles, the sumptuous metallic tints, green, blue, red, yellow, copper, bronze, crimson, &c., being sufficient to excite the admiration of anybody. They are chiefly found upon flowers; some frequent wattles, and others are taken upon bushes. They love the hot sunshine, being generally sought in vain in the cool of the morning or the later hours of the afternoon. The length varies from $\frac{1}{2}$ to 7 inches, our largest being about $1\frac{1}{2}$ in. About 330 species appear in Masters' Catalogue.

PROCEEDINGS OF SOCIETIES.

ROYAL SOCIETY OF VICTORIA.

The Royal Society of Victoria held the first meeting of its session for 1881 on the 10th inst. The President, Mr. R. L. J. Ellery, occupied the chair, and there was a fair attendance of members.

The President read the Annual Report and Balance-sheet, which were duly adopted.

A letter was read from Dr. James Stirton, of Glasgow, expressing his gratification at having been elected an honorary member, and requesting that some of the members would collect and send him specimens of the Cryptogamous plants of the colony to enable him to complete their proper classification, and undertaking to return to the collector the proper names of the species sent.*

Mr. C. A. Chesney, B.E., was nominated as a member, and Messrs Hiscocks, Watts, and G. W. Selby, jun., were nominated as associates.

Pursuant to notice, Mr. Ellery invited discussion as to the best means of preventing the deleterious effects experienced by miners from the poisonous gases arising from the explosion of dynamite, lithofracteur, &c. Mr. Cosmo Newberry explained the nature of these substances and the results of their explosion, showing that if perfect combustion was effected, no deleterious effects would follow, the products being small quantities of the vapor of water, carbonic acid, and nitrogen, while with slow or imperfect combustion the vapor of nitro-glycerine was distributed, a very small quantity of which is exceedingly deleterious. Imperfect combustion frequently arose from the very bad habit, common amongst working miners, of placing ordinary blasting powder in the same bore with dynamite, under the mistaken notion that the one would help the other. Lithofracteur and dynamite cartridges, if kept for a considerable time under the influence of moist heat, such as our ordinary summer weather, suffered from the volatilisation of a portion of their substance, leaving the remains less explosive, and consequently its slower combustion yielded vapour of nitro-glycerine and some of the lower nitrous oxides. Mr. Newberry further explained the composition of various forms of nitro-glycerine compounds, and expressed his opinion that the fumes resulting from the explosion of pure dynamite were less noxious than those arising from the explosion of gunpowder.

Mr. C. R. Blackett was much pleased with the very lucid explanation given by Mr. Newberry, which was the more valuable because resulting from actual experiments, and he was gratified to find that these results were in perfect harmony with his own conclusions after a careful theoretical scrutiny of the subject. He further mentioned that in the construction of a tunnel under the Severn recently, strict rules were observed in the matter of explosions, and a certain period always allowed to elapse after each explosion before the miners were permitted to return to their work. In his mind there was no doubt that careful firing and proper ventilation would entirely prevent any ill effects on health after explosion.

* NOTE. — We recommend collectors to attend to this offer without delay. — [Ed.]

Mr. W. C. Kernot said that miners were very careless in using explosive compounds, and he supposed used mixed charges under the impression that something was gained thereby, because gunpowder was believed to strike up and nitro-glycerine to strike down. These apparent effects were, however, due to the different rapidity of action of each, and consequently, it was wrong to mix two explosives when their combustion was not simultaneous. He would suggest that proper ventilation offered the surest means of surmounting the difficulty, and of the two methods of accomplishing this—by conducting a current of fresh air into the “face” of the mine, or by withdrawing the foul air by suction—he much preferred the latter, and described a very ingenious and simple method for accomplishing this that had lately been patented.

Dr. Neild described the pathological effects resulting from inhaling the fumes after explosion of dynamite, &c., as consisting principally of cranial and facial neuralgia, and mentioned that the Germans were in the habit of mixing camphor with their dynamite, under the belief that it would neutralise the effects of vapor of nitro-glycerine.

In reply to various queries, Mr. Newberry mentioned that there was always a certain portion of these explosive compounds undergoing volatilisation; that the emanation resulting from this he had collected, and proved it to be highly explosive; that it was still open to question if inhalation of vapours arising from imperfect combustion was permanently injurious; that the work-people engaged in the manufacture of these compounds suffered a little upon first commencing the work, but soon became inured to it, and as a body were apparently well nourished, and very healthy, whereas any visitor going through the works would certainly suffer a considerable amount of headache. His own belief was, after a very lengthy experience, that miners would cease to notice any ill effects if they would only adhere to the directions for using these compounds, printed on each package, which were very explicit and very simple, the evil results ascribed being solely owing to imperfect combustion, and general carelessness in the storing and using of these substances.

After some conversational discussion the general opinion of the members present seemed to be conclusive as to the accuracy of Mr. Newberry's opinion. The meeting then closed.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held its ordinary monthly meeting on the evening of the 31st ult. The President, Dr. Ralph, occupied the chair. Two new members were proposed.

Dr. Ralph read some interesting notes on the action of calcination on plant leaves, and exhibited specimen slides. Some discussion followed, and it was considered that the field of enquiry thus opened up would yield valuable results. It was also suggested that the President should resume the subject at one of the practice meetings.

The Secretary read a communication from Mr. Wooster, “On a new Method of Illumination for Opaque Objects under High Powers.” This consisted in using the conical, silvered nose of the objective

as a reflector, by which means almost any angle of obliquity could be obtained, and, as the light came from one side only, shadows were strengthened, so that the finest markings on test objects were resolved with an effect that was startling when first seen.

The paper was well illustrated by a diagram drawn on the black-board. Several members undertook to test the method, while all seemed impressed with the novelty of the method and its brilliant results. The meeting then closed.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The Field Naturalists' Club held its usual monthly meeting at the Temperance Hall on Monday evening, the 14th ult., and there was a fair attendance of members, about thirty being present. Dr. Lucas, one of the Vice-Presidents, occupied the chair.

The minutes of the previous meeting were read and confirmed.

On a ballot being taken, the following gentlemen were elected as members:—Dr. Clarke, Dr. Schleicher, Messrs F. Tate, W. J. Browncombe, R. H. Nancarrow, C. Troedel, and J. Aitken.

Messrs Peter Mackay, D. Sullivan, of Moyston, and F. J. Tisdal, of Wallhalla, were nominated as new members.

A paper was promised by Mr. J. N. McKibbon; and it was also announced that at the next meeting Baron von Müeller would read a paper contributed by Mr. D. Sullivan, entitled "A Census of the Grampian Plants."

Dr. T. P. Lucas read the concluding part of his paper descriptive of a recent trip to Healesville, and the entomological specimens to be found there.

Mr. H. Watts exhibited a variety of specimens of green sea-weeds (*Zoospermæ*) of Victoria, comprising species of *Caulerpa*, *Bryopsis*, *Cladophora*, &c., describing their habitats and the peculiarities of growth and reproduction which distinguish them from the red and brown series. He said that the most recent authorities, together with his own experience, had proved many to be composed of a single cell. This statement provoked a lively and interesting discussion, and, notwithstanding that many differed from this opinion, Mr. Watts must be considered to have maintained his position,—at least until stronger evidence is adduced to disprove it.

The following exhibits were laid on the table:—By Miss Guilfoyle: Electric eel, from New Guinea; various species of mantis, cat-fish, and banded snake, from Solomon Islands; and species of fish from New Hebrides. By Mr. F. Kernot, a blue-tongued lizard. By Mr. D. Best, *Hymenopterous* insects. By Mr. J. E. Dixon: Mud-nests of *Hymenopterous* insects, *Lepidoptera*, and *Coleoptera*. By Dr. T. P. Lucas: *Coleoptera* and *Lepidoptera* from Healesville, also a rare lichen-like *Geometer* from Brighton. By Mr. F. G. A. Barnard: Specimens of *Cyphurania*, *Arthropterus*, and *Schizorhina Philippi*. By Mr. C. French, ten species of Longicorn beetles (genus *Batocera*) from Malay and other islands. By Mr. J. N. McKibbon, several species

of *Coleoptera* and *Lepidoptera*. By Mr. P. Dattari, some fine specimens of foreign *Coleoptera*. By the Rev. F. C. Spicer: Specimens of *Buprestis* and *Schizorhina*, also a peculiar form of *lepidopterous* insect.

The usual *conversazione* closed a very enjoyable meeting.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

We abridge from the *South Australian Register* the subjoined account of the March meeting of the above society:—

“The usual monthly meeting of this society took place on Tuesday, 1st March, Professor Ralph Tate in the chair.

A large list of donations to the library was read by the Honorary Secretary.

Mr. F. M. Bailey, F.L.S., Government Botanist, Queensland, was elected a corresponding member.

The following specimens were forwarded to the Natural History Director of the Society:—Jurassic fossils, from Mr. Chandler, of the Peake, including certain forms not previously known to occur in Central Australia, also pitchstone and obsidian bombs, and a new land snail. Mr. Tepper, of Ardrossan, sent a *Leptaena* from the Ardrossan limestones, further corroborating the Lower Silurian age which had been assigned to them. Mr. Boyer sent, amongst other specimens, a complex crystal of red haematite, of unusual form, found at Eudonda; Professor Tate, a specimen of gold immersed in galena, from Ballarat.

Mr. A. Molineux mentioned some supposed discoveries which he had recently made with respect to the reproductive organs of the shark and ray tribes.

The Curator of the South Australian Institute Museum exhibited a remarkably fine specimen of a crayfish (*Palinurus ornatus*) peculiar to the Mauritius, measuring from the tail to the end of the antennæ 4ft. 8in., presented to the Museum by Mr. J. Jacobs, member of the Royal Society of Arts and Sciences, Mauritius; also, some specimens of an extraordinary species of ant found in Central Australia (*Camponotus inflatus*—Lubbock), commonly called the honey ant.

A paper was contributed by Mr. J. G. O. Tepper, F.L.S., on the potato-moth, of which the following is an abstract:—‘A destructive moth is described, the caterpillar of which drills tunnels into the tubers of potatoes and thereby destroys great numbers of them, the first appearance of which had been noticed by the author about thirty years ago. The insect is scarcely above half an inch in length, and appears to breed very fast as long as there is any moisture left, even in the putrid tubers, the destruction of which is urgently recommended, as mere burying does not kill the grubs; also the washing of the tubers, before storing, in salt water or a weak solution of sulphuric acid, in order to destroy the eggs and young grubs, and that great care be exercised in storing them, so as to be able to exclude the insects or check their increase, hundreds of tons being presumably destroyed annually by their agency alone.’ A short discussion followed, in which it was stated that Mr. Merrick had given an opinion that the micro-lepidoptera of Australia comprised at least 10,000 species.”

NOTES, MEMORANDA, &c.

From *Engineering* we take the following:—

"A curious and novel voltaic cell has been devised by Herr Wöhler and described in *Liebig's Annular*. The chief peculiarity is that both plates are of the same metal—aluminium,—and a tolerably strong current is supplied. The cell consists of a glass vessel six inches high, filled with very dilute hydro-chloric acid, or caustic soda, and containing an inner porous pot filled with concentrated nitric acid. In each compartment is placed a cylinder of aluminium provided with a projecting leg, which passes through the cover of the vessel, and acts as a contact piece for the electrodes or conducting wires. As soon as the aluminium cylinders are plunged into the acids, a current is given off sufficiently powerful to heat a platinum wire red hot."

The opinion is gaining ground, especially amongst French *savans*, that the musical sounds produced by Professor Bell on discs of various substances, such as mica, india-rubber, metal, and wood, by holding them in the path of a rapidly-interrupted beam of light, are really due to heat and not to light. Radiophonic notes—such is the new term—have been obtained by M. Mercadin from ordinary gas lamps without employing lenses to concentrate the interrupted beam, by simply bringing the receiving disc near to the source. Even a plate of copper heated to a bright red heat produced very distinct musical tones, which gradually died away as the plate cooled to a dull red, followed by obscurity. The fact that when the receiving discs were coated with silver on the side next the light the effects were feeble, and that when coated with absorbent lamp-black they were strong, would seem to tell against Professor Bell's conclusion that the sounds were due to light."

Popular lectures on Science are common enough now in England and America; but the French have taken the lead among the nations in organising a popular observatory at the Palace of the Trocadero, Paris. Founded by M. Leon Jaubert, it has just been opened to the people, and many hundred free tickets have been applied for and received. Each ticket admits the owner to the observatory between 1 and 4 o'clock in the afternoon, and from 8:30 to 11 o'clock at night. It allows time to attend the practical school of astronomy, the demonstrations on instruments, the library, the scientific conferences, and the popular laboratories of micrography and general physics. The observatory already possesses several equatorial instruments and telescopes, one of these being a very fine short-focus telescope presented by M. Jaubert; and ere the coming spring a variety of instruments will be added. It is intended, for instance, to have a large celestial projector capable of throwing an image of the Sun ten feet in diameter upon a glass screen, so as to enable a number of observers to examine it simultaneously. Another and still larger projector will be used to throw the images of planets, nebulae, and stars."

THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, MAY, 1881.

ON THE COLLECTION AND PRESERVATION OF INSECTS.

BY FRED. BARKAS.

[Read before the Naturalists' Field Club, School of Arts, Sydney, N.S.W., 1st April, 1881.]

The collection of Moths and Butterflies having been for many years my special hobby, I thought I could not do better than put together a few practical hints on that pursuit, not addressed to accomplished and scientific entomologists, but offered for the help of any tyros who may wish to take up what may be styled a health-giving and fascinating branch of Natural History studies.

To hunt butterflies appears to be almost an instinct in the boyish, if not in the adult, human mind; for who amongst us does not remember those joyous days when the sight of a butterfly caused us to forget at once every consideration except the desire to catch the floating flower. If we had not a properly constructed net, what of that! Was not our cap or even our coat a good enough instrument of capture? Knocking the dust off the wings, even breaking the wings outright was of little consequence if we only succeeded in getting the lovely creature between our clumsy fingers to hold it up to the admiring gaze of our envying companions.

Then some of you doubtless will have experienced the next stage: the boy begins to keep caterpillars in all sorts of boxes in places where they are sure to crawl out and frighten the womenfolk of the house; he learns to *set* the insects, to rear from eggs or from larvæ: he gradually gets together a collection, and has even dreams of a cabinet with his prizes arranged under their Latin names,—when the time comes for him to go to shop, or the office, or the university, as the case may be, and he soon learns to look upon moths and butterflies with all the contempt of a *man* seventeen years old. Now if there be any real love for Nature and Science in him, he loses that feeling at much the same period as he begins to see that it is not a very dreadful thing to carry a paper parcel. I have often been amused at the dislike displayed by boys of from 17 to 20 to the carrying of a paper parcel in the streets, and how they lose that feeling as they begin to think more of their pursuits and less of the impression their personal appearance may make on the street passengers. Through these various stages we come to the time when we become members of a Naturalists' Club and feel a deep and varied interest in all things created, in birds and beasts, fishes and insects, in the loveliest flowers of the field, and in the humblest weed of the wayside—in a word we

have arrived at that stage when the wondrous beauty and infinite variety of this great Universe is of more interest than the important matter of personal appearance. And what has all this to do with insect hunting, you may ask? A good deal; for the insect hunter, scientifically the entomologist, must study convenience before conventionality: his coat must be of ample capacity, and have many pockets; he has a strong bag for boxes over his shoulder; his net is in his hand: his unmentionables must be of strong material, so that he need fear "nor bush nor briar," and his boots must be of the good solid kind made for use and comfort, and not to show into how small a space the human foot can be pinched.

Now let us imagine that we are all interested in studying the butterflies and moths, which are both plentiful and beautiful in this country, and that we are about to prepare for the field. What appurtenances shall we require, and how shall we manage to make them as portable as possible.

There is the net—Well of course you can go to a Naturalist, *i.e.*, a person who deals in such things, and buy one ready made, with brass mountings and everything neat, complete, and dear; but if you take my advice you will always prefer to make your apparatus for yourself whenever that is possible, and any one can make a net: get a piece of stout iron wire of about 4ft. 6in. to 5ft. long; bend it into a circular form with legs some four inches long and little toes turned inward. Next buy a yard of strong gauze of dark green or brown colour, these being least conspicuous; if you are clever with needle and thread you may make the gauze bag yourself, but usually a lady's help is called in: the bag is cone-shaped, with one straight side; the apex has a round piece of gauze sewn in, leaving no seam at that part: a strong calico tube is made for the ring to slip through, to which the gauze is sewn. The handle or stock is commonly two feet long; you might think that a longer handle would give you a wider and more useful sweep. In practice this is found not to be the case because of the unwieldiness of a long stick: notches are cut to admit the legs of the iron ring and a hole bored through the stick for the turned-in points; a brass slide like that which is used on a fishing-rod jams the legs lightly into the notches, or it may simply be bound round with twine. A net ring of a foot and a-half diameter is not a very portable article, so that a ring which will fold up to allow of its being carried in a bag is desirable, but not so easily made as the above.

Now suppose our net is made and tightly secured to the handle, and we are out in the hunting field: a butterfly we would like to capture is hovering from flower to flower at a little distance off, excitement overcomes discretion, we make a rush at our intended victim, and wildly swing our net: then we hold up the net to the light to admire our captive and, "Missed it, by Jove" is all the result: there away some 100 yards off flits the butterfly in a most unconcerned manner; we make up our mind to run it down, and away we go under a sweltering Sun only to learn how fast and how easily a butterfly can fly. I used to go hunting with a very old gentleman at one time, and it often puzzled me how he was so successful in his captures; so I asked him how he managed it? "Never be in a hurry, my boy," he said,

"and never run after an insect if your first shot is a miss,"—and his advice you'll find very good.

We will suppose you have gone up quietly to the insect and gently placed your net over or caught it by one carefully considered sweep: a sweep of the net is always necessary so as to get your captive right to the bottom of the bag; you turn the ring one fold, and you have it safely imprisoned ready for inspection. If it be in damaged condition, or of a kind you don't want, let it go at once, but if you wish to secure it the question at once arises, How am I to get it out of the net without knocking the scales from the wings? Have some chip boxes with you,—those known to druggists as salve boxes; they are sold in nests of four sizes: as they are rather liable to be broken it is advisable to gum paper or muslin round the joints. Take a box of a sufficient size for the insect in the net: slip the box over the insect with the right hand while the left keeps the apex of the net uppermost, as most insects in trying to escape fly upwards; then slip the lid over the box by scraping along the gauze so as to compel the captive to fly into the box.

I'm afraid I can't explain the operation very clearly, but it is soon learned in practice. The box can now be put into the proper pocket, and a new victim looked out for. There are some insects which, when put into a box, dash about so violently they break themselves to pieces: these must be at once killed, either by a sharp nip in the thorax or by means of the poison pot, familiarly known as a "stink-pot." The killing bottle I have found best suited for use is made thus:—Get a wide-mouthed stoppered bottle of, say, 4in. high, place at the bottom a few pieces of cyanide of potassium, and cement them in tightly with a $\frac{1}{2}$ in. of dryish plaster of Paris; smooth off the surface, and carpet it with a round of blotting paper. The cyanide of potassium gives off slowly prussic acid in sufficient quantity to poison the air of the bottle and to kill any butterfly or moth in a few seconds. There are many other poisons used, such as chloroform, crushed laurel leaves, and benzine.

You next require some entomological pins: the name is much more formidable than the thing; they are fine and rather short pins, and are sometimes plated with gold to prevent corrosion; they can be bought of various sizes, or in assorted packets, from any good naturalists' dealer. You want a strong box, 6in. by 4in. by $2\frac{1}{2}$ in., lined on the inside with cork to enable you to stick in the fine pins. In the meanwhile the moth in the stink-pot is quite dead: shake it into the palm of the left hand, and manage as best you can to stick a pin perpendicularly through the centre of the thorax, and pin your treasure into the cork box. It is advisable to take one or two empty $\frac{1}{4}$ or $\frac{1}{2}$ lb. mustard tins to carry any caterpillars you may find and wish to rear: and a little cotton wool is useful in packing any pupæ you may find; a small bottle is often useful.

Now that we have the full equipment for the field, a many-pocketed coat, a shoulder bag, net complete, killing bottle, cork box, and a good supply of chip-boxes, *WHERE are we to go, and WHEN?* Well, broadly speaking, anywhere out of town, in the day-time for butterflies and at night for moths. For day hunting choose a still sunshiny day and go out of the town; go to rough land by the sea-side, or into the grassy

flats in the openings of well-wooded country, in the paddocks, gardens, or by the road-side, anywhere, and you are sure to find butterflies flitting about. Of course various species love various situations, and the observant hunter soon learns the favored localities. Then there are always some moths which fly in the day-time, though I know of no night-flying butterfly. It is difficult to say with certainty which is the best time of day—the time most favored by the butterflies: for my own part I have found that from 10 to 11 in the morning they are most usually on the wing; still I must say I have seen many actively in search of flower-sweets soon after sunrise, while our plentiful and widely dispersed friend the Painted Lady may often be seen on the wing in the evening twilight.

Many moths are caught in the day-time by beating bushes and shrubs with a short stick held in one hand while the other hand holds the net ready to catch any insect which may fly out to see what the matter may be. I have caught many rare moths of the class *Geometer* by this method, and I can highly recommend it. But the great time for moth-hunting is the twilight, or in the stillness of night. It is one of the pleasantest occupations I know of, that of strolling along the road-side in the cool twilight netting now and again a moth as it flits across the dimly-lit path, or as it appears a dark speck against the western sky: then as the night advances we follow another plan,—the net is laid aside, and the sugaring-pot taken up instead.

Sugaring consists in smearing any convenient fence or tree with a sweet alcoholic odoriferous mixture: it may be coarse treacle with rum, or a syrup made by boiling common brown sugar with sour beer. I have always used rum and treacle, the commoner the quality and more powerful the smell the better does it suit our purpose. I am sorry to confess it, but it is nevertheless a fact that moths, without exception, are awful drunkards, and their weakness for rum is often their ruin. Sugaring is most successful on a warm, close, cloudy night, and there must be no moon. You choose your field of operation and proceed to smear a ring round a picked number of fence-posts and tree-trunks; then you have an idle time until about 9 o'clock, when you begin to make your rounds of the baits. It being dark you had better have a companion with you to carry a dark lantern: go cautiously up to the bait and flash the light upon it; you will in most cases be rewarded with the sight of a number of shining eyes and active probosces; most of the insects will be too drunk to fly away, and, by placing a box under one and touching the head with the lid, it will in most cases fall into your box. You proceed after this wise until you are tired or until all your boxes are filled; I have, for my own part, many vivid recollections of great captures from sugaring, having sometimes caught from 150 to 200 insects before midnight.

There is a plan which Mr. A. R. Wallace found most successful when in the Islands of the Malay group: he chose a dark night, and placed a good glass-enclosed lamp on his verandah, and awaited his visitors, and he had, as he so charmingly tells in his work on the Malay Archipelago, visitors in thousands: they came so fast and so numerously to the light that he was unable to catch one half the

specimens he would have liked. He found one strong objection to this lamp invitation: not moths alone crowded to his verandah, but all kinds of beetles, mosquitoes, and winged beasts, who were not too refined in their manners.

On the hunter's return home he must, at his earliest convenience, *set* his captures. First, those not already killed are consigned to the killing-pots, and those already dead and pinned are carefully gone over and the worthless ones weeded out. In a warm climate like this the legs and wings will soon become rigid and stiff, so that they must be softened or relaxed before being *set*.

Relaxing is done by steaming in an ordinary steam-pan, or better and more slowly by placing the stiff ones in a tightly-closing box having some damp sand in it and kept in a warm place until the joints of the legs and wings are quite flexible.

The operation of *setting* or *mounting* is perhaps the most difficult business the insect collector has to accomplish, as it requires a steady hand, neat fingering, a true eye, and a mature judgment. In this work I have often found that a woman's deft fingers turn out the best results, and I knew one lady who became so expert that she thought nothing of setting 100 insects in a morning.

For *mounting* you require setting boards, paper, and card braces, some ordinary short pins, and a setting needle.

- 1.—*Setting Boards* are rectangular pieces of pine about 10in. long by from $\frac{1}{4}$ in. to 5in. broad, faced with cork and covered with thin white paper, somewhat raised longitudinally, with a deep groove in the centre from end to end.
- 2.—*Braces*, small, rectangular pieces of cream-laid note paper and long acutely triangular pieces of cardboard.
- 3.—*Setting Needle*, the handle of a camel hair pencil with a needle inserted into one end.

Having got your insect dead but flexible, and a properly sized pin straightly put through its thorax without much damage to its plumage, you now pin the body in the cork groove so that the wing joints are just on a level with the edges, press the right wing down with the setting needle, and place a paper brace with one pin over it: with the point of the needle in the strong muscle of the wing, gently push until it is at a sufficient height: this can only be learned by actual practice; tighten the brace over the wing by pinning the loose end, and place the lower wing in proper position. Do the left wing in a similar way, so that the two are evenly balanced. Place one of the long cardboard triangles on each wing so that the ends may not curl up. Pin out the legs and antennæ to the best of your judgment, and put the insect away to dry in a safe place as free from damp and dust as possible.

In a few days the insects will be quite dry and stiff, and the legs and wings will maintain their set position when removed from the setting boards to their proper place in the collection.

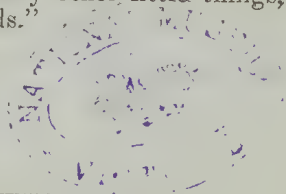
And here comes in a sore trouble to the entomological beginner, how to name and arrange his specimens, for good books are neither plentiful nor cheap, descriptions are difficult of application, and good accurate figures are often unprocurable, so what is one to do? I can

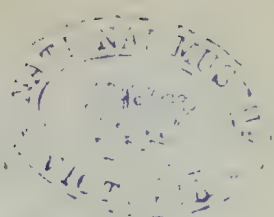
only recommend patience and a full utilisation of what opportunities may offer,—such as comparing your specimens with those in museum and private collections and making yourself as well acquainted with the principles of classification as possible, and you will soon find it perfectly easy to distinguish butterflies from moths, and gradually the *Nocua* will be easy to separate from the *Geometræ*; and I doubt not that before many seasons you would be versed in the *Fineæ* and *Tortricæ*.

One often hears it said by impatient and little-thinking youth—"What a bother those Latin names are; why can't we have English ones?" Just as if the Lepidoptera were confined to countries inhabited by English-speaking people; or would they have Russian, and French, and German names, and be obliged to learn all these before being able to make any comparative or comprehensive study of the subject? I fancy they would find it much more convenient, as it is at present, for all nations to use Latin names. And they are not difficult to learn and remember,—at least this should not be so to Australians, who have such names as Illawarra, Ulladulla, Bogamildi, Gunyerwarilda in every-day use.

As to what sort of boxes or cabinet the collection when made is to be kept in, will much depend on the means or ambition of the collector, but they are necessary; they should be dry and dust-proof, as nearly air-tight as possible, and well supplied with camphor to keep away vermin.

In concluding this very sketchy paper, I would just say that I know of no more delightful pursuit than this branch of natural history; it adds a zest and delight to one's journeyings about the world: on a walk through a flowery English meadow, over a bleak Scotch moor, by the loveliest lake in beautiful Switzerland, or high up on the mountains near the line of eternal snow, on a ride through the bush, or over the rolling plains of the West, you will always find some winged companion to arouse your interest and admiration, the perceptive faculties are quickened, and healthfulness of mind and body are induced by the fresh air and exercise. Then what wondrous studies of colour and harmony may be made from Nature's wing-painting. Mr. H. H. Emerson said to me once that he learned much of his skill in contrasting and harmonising the colours in his pictures from a careful study of the tints on moths' wings. Again, how useful a link the Lepidoptera form in the great study of the distribution of species, age of islands, &c.; in fact moths, like many other little things, may be made the small beginnings of great ends."





THE HABITS OF THE LYRE BIRD.

BY F. J. WILLIAMS.

[Read before the Field Naturalists' Club of Victoria, 14th February, 1881.]

In my previous papers I have given the result of my observations on the habits and characteristics of the Platypus, as also the Marsupials of Australia. On the present occasion I propose to bring under your notice such particulars as have come under my observation relating to the Lyre Bird.

The Lyre Bird (*Menura superba*)—native name, Bullan-bullan—is now so well known, and has been so often described, that I shall simply give my personal experience of the habits of the bird during the time I have collected specimens of them, which I have done occasionally for about thirty years. Williams and Leadbeater exhibited a case containing both male and female, together with the egg, at the first Exhibition held in Melbourne in the year 1854; and the late Dr. Becker described the egg, and the peculiar construction of the nest, in a paper read before the Philosophical Society, of which the following report appeared in the *Argus*:—

“THE MENURA SUPERBA.

“Until lately the egg of the lyre-bird was unknown in Europe, but during the Melbourne Exhibition in 1854 Messrs Williams and Leadbeater exhibited a case containing stuffed lyre-birds and an egg of the same. By permission of the owners of the egg, Dr. Becker made a drawing of it, and sent the sketch to Dr. Kaup, the celebrated German professor of natural history, who presented it for publication to Dr. Cobanis, of Berlin. From this time the egg of the “*Menura superba*” has in some measure become known at home. The fact of the well-known French naturalist, Jules Verreaux, requesting that the original drawing might be forwarded to him proved the great interest taken in the subject. The nest and egg exhibited by Dr. Becker was brought to Melbourne by an aboriginal of the Yarra Tribe. The name given to the bird by the natives is Bullan Bullan, the word having some similarity to the gurgling note which the bird at times is heard to emit. The nest is ten inches in diameter and five inches high, closely woven from fine but strong roots, the inside being lined with the softer feathers of the bird. The bird surrounds this inner nest with a sort of exterior wall of sticks and pieces of wood, grass, moss, and leaves, in such a manner that it projects over the genuine nest, affording the sitting bird a shelter from above. An opening in the side serves as an entrance, through which the female enters backwards with her tail laid over her back. The female lays one egg a-year of the size of a duck's egg. The colour is a light ash grey, with darker spots slightly tinted with brown. The young exhibited by Dr. Becker dropped out from the egg, which was accidentally broken, and is, to naturalists, an object of great interest. The period of incubation is believed to begin in the first week in August, and the young ones break through the shell in the beginning of September.”

. In the month of June the birds begin to pair, and build their nest, or repair an old one, and generally lay their egg in the beginning of July or August. I once found an egg, with the young half formed in it, on the 16th of June, 1870: this was at Starvation Creek, Upper Yarra. When the young one is hatched it is without feathers, and covered with a soft blackish down; the mother feeds it in the nest for about four to six weeks, and it is able to fly in about three months; therefore in this respect it very much resembles the English Black-bird, or Thrush. Its food consists of worms, beetles, and insects; the

mother will scratch for this food similarly to the barn-door fowl. The locality in which they generally live abounds with worms, scorpions, and small land-crabs, and also shells which contain a kind of snail: these they break by knocking them against a stone, or some other hard substance, and extract the snail, which they eat with great relish. They build but once in the year, and only lay one egg, although I have repeatedly counted as many as 40 eggs in the ovary of the female bird. I believe they live for many years, but cannot say how many; nor am I competent to state whether they live long enough to bring to maturity the number of eggs stated above, at the rate of one in each year. I believe, if the egg is destroyed early in the season, that they will lay another one, but I have never found more than one in the nest. I have been acquainted with nearly all the native blacks on the Yarra and the Goulbourn for 30 years, and I have frequently questioned them on this subject—and they all state that the Lyre Bird breeds only once a-year, and never lays more than one egg in a nest each year. The young are very delicate, and difficult to rear; yet if kept in a warm place (as they cannot stand the cold when young) and carefully fed, a little at a time and often, they will thrive well and soon get very tame—so much so that they will follow you about and eat out of your hands, and seem to have no fear or dread,—unlike what they are in their native state, being then the most timid and shy of all birds. Their sight and hearing being very keen, it is seldom you can get a view of them, although there may be hundreds of them in the country you pass through. When the female is sitting she will always defend her nest, losing all the shyness or timidity which is her chief characteristic at other times; and she will fly from tree to tree in order to attract you from her nest, and should you happen to go near to it she will return screeching, fearless of danger. The male bird seldom makes his appearance but to be off again at the slightest noise or sign of danger. They do not obtain their full plumage until the third year: during the second year the plumage of the male and female are very much the same—so much so, that only a person of experience can discern the difference, as they seldom fly, and then only from high to low ground, choosing rather to use their legs to escape danger. They run very swiftly on the ground, and will hop from log to log, from one low tree to another, with amazing agility. The male is much more shy than the female, therefore more difficult to shoot. The best time for shooting them is in the pairing season, when the male birds will chase each other; but this is now wisely prohibited by law. I have shot as many as six male birds without moving from behind a log, but this is not a common occurrence. When the female is sitting the male bird is seldom far off: he scrapes together a lot of loose earth and makes a hill about three feet across, elevated in the middle. This is generally made in some secluded spot amongst low ferns. He visits it in the morning about 10 o'clock, and again about 3 in the afternoon, remaining each time about an hour: he jumps about on the top of the mound, going through all sorts of antics, and imitating all other birds or animals he has ever heard: hence he is called the "Australian Mocking Bird." I have shot more male birds when whistling and singing on their hills than anywhere else; but great care is required, as they are always on the watch, and at the slightest

strange noise they disappear as though by magic, when it would be useless to look further after them, until they again return to their hill, which they will do when they suppose all danger to be past. They seldom use the hills after the breeding season: they may occasionally remain to sing a few notes and be off again. The female will use the same nest for years, and the cock the same hill. At night they generally make down to the creek to roost, choosing a secluded spot sheltered from the wind, and mostly in a low tree. They commence to sing at the first dawn of day, even before they leave their roost: they then gradually make their way up the highest hill, feeding as they go, occasionally singing, chattering, and mocking. Such are a few of my observations on the habits of the Lyre Bird.

PROCEEDINGS OF SOCIETIES.

THE ROYAL SOCIETY OF VICTORIA.

SPECIAL MEETING.

A special meeting of the Royal Society of Victoria was held on Wednesday evening, 6th April. The members of the Microscopical Society of Victoria, and of the Field Naturalists' Club, being present by invitation. Mr. R. L. J. Ellery, F.R.S., occupied the chair, and intimated that the meeting was called for the purpose of meeting Baron Miklouho Maclay and considering a proposal for the establishment of a Zoological Station at Port Jackson. The chairman then introduced the visitor to the meeting.

Baron Maclay briefly returned thanks for the kind reception accorded him, and stated that Professor McCoy would indicate to the meeting the objects to be attained by the use of a station such as that proposed.

Professor McCoy briefly stated some of the many advantages to be derived from the establishment of a Zoological Station in the Southern Seas: in fact, such a station had now become one of the necessities of science, particularly as a large amount of recent interesting researches in Europe and elsewhere had tended to show that development or animal change depended on embryonic change. Many able men in past years had given considerable attention to the study of living objects at the sea-side: among whom might be mentioned Professor Agazzis, who, favorably located for making such observations, had filled many volumes, describing the life-history of a great variety of animals in their natural habitat the sea. Even before this, our distinguished visitor Baron Maclay had, in conjunction with Dr. Dohrn, conceived the idea of establishing a sea-side laboratory to enable observers to make their researches continuously, where naturalists might set up their microscopes, arrange their growing cells, live cells, and other similar contrivances, and study the objects of their enquiries uninterruptedly, and with the fullest confidence that, when absent for a brief period, they would on their return find everything

in perfect order just as they left them. Such an advantage could never be depended on where observers were restricted to inland aquaria, museum laboratories, or in their private houses, where antagonistic influences were often in the way to prevent success. At a Zoological Station on the sea-side working was easy, and the benefits to Science derived from recorded observations made under such circumstances were valuable beyond measure, where every stroke of the pen added actually and really to the stock of knowledge. With so many able and aspiring naturalists before him, he would not dwell upon the value of observing carefully and recording truthfully, and only desired to point out that there was an enormous amount of scientific knowledge yet to be put down on paper. Late researches had entirely changed the physiological aspect of animal life, and this in a great measure owing to the many useful resources offered by the Zoological Station at Naples: which, established more than thirteen years ago by Baron Maclay and Dr. Dohrn, soon became the centre of attraction for naturalists in all parts of the world, and rapidly rose in importance until it became the great centre of biological researches. Owing to the enlightened energies of Baron Maclay, more than one hundred able men, besides great numbers of students, had been enabled, by residence at the station for longer or shorter periods, to mature a series of observations that may truly be said to have conducted scientific thought into new and natural lines. So great were the advantages arising from the establishment of the Naples station, that other stations were soon started in different parts, notably one in the Bristol Channel, where already much good work has been done. At these stations observers acquired knowledge that could not be obtained by the study of objects in museums, where the act of preserving unfortunately destroys many important points. All this must be changed, and observation must be made chiefly on living objects. Now it has become necessary that the Southern hemisphere should have a station of its own. It is therefore the duty of scientific men here to avail themselves of the services of Baron Maclay, who had selected Watson's Bay at Port Jackson as a site remarkably well suited for the purposes of a Zoological Station. The Sydney Government had given the ground required, and also agreed to give half the cost of erecting suitable buildings. The Baron, with characteristic energy, had called for tenders, and had accepted one for £600, £200 of which had already been subscribed in Sydney, where, doubtless, the whole of the money could readily have been obtained, but Baron Maclay considered it only right that Victoria should have the pleasurable duty of contributing to a scheme thus widely beneficial. The cost of keeping the station would probably be about £100 per annum, half of which was promised by the Government, and the rest would be raised by light fees.

Baron Maclay desired to thank Professor McCoy for the able and lucid manner in which the scheme had been explained. He felt sure that all would agree there was a want of such a station in every educated community. Many men of science would come here from Europe and America, if they were assured of finding a place to work in. When he first came to Sydney the only place he could find where he could work at all was the cellar of the Australian Museum, in

every way ill-fitted for scientific labor. The Sydney Harbor is, without doubt, by its nature pre-eminently suitable for a zoological station, and it had been a pleasant duty for him to endeavor to bring such a scheme into effect. In about another month the station will be open for students, and he anticipated a great deal of useful work would soon be done there, as the Australian fauna is not only very interesting, but very important. He was very much pleased to find that the Royal Society of Victoria had willingly joined itself in the movement. Already he had received letters from Europe asking if the station is to be established. As so much work will have to be done here, it will soon be necessary to establish a station at New Zealand; and he himself proposed to start one at Japan almost immediately for the purpose of studying the Pacific fauna, of which very little was known, while there was scarcely anything known of the Australian fauna.

Professor McCoy stated that any of the societies contributing will have the right to nominate persons for admission to the station.

Mr. C. R. Blackett wished to know would the station be under the direction of the Government or vested in trustees, also what would be the cost of an aquarium.

Baron Maclay replied that the station was already vested in four trustees, Dr. Cox, Mr. E. P. Romsay, Mr. W. A. Haswell, and himself, who would have sole control. With regard to an aquarium, he had written to Dr. Dohrn at Naples for information.

Professor McCoy moved a resolution—"That the Royal Society, having heard the proposition of the Baron Miklouho Maclay for the establishment and maintainance of a Zoological Observing Station at Sydney, approves of active steps being taken to provide funds, and by other means to aid the movement.

Mr. C. R. Blackett heartily seconded the resolution, which was then carried unanimously.

Dr. Ralph begged to suggest that a subscription list be at once opened, so that those present might immediately put down their names.

Mr. J. R. Y. Goldstein said that, after the able description by Professor McCoy, all present must feel convinced that it was wise to foster this undertaking. Some had said that Melbourne should also have a station, but his experience of some hundreds of miles of the south coast of Australia led him to expect that any movement for the establishment of such a station would require to look farther to the west for a suitable locality. In the meantime they were called upon to support the first station in the Southern hemisphere, and, as naturalists, they should look to the results likely to ensue, not regarding the position chosen. The sum required was really so small that there ought not to be any difficulty in obtaining it; but as it had been stated that each society contributing would have certain rights of nomination, he would beg leave to move—"That the President and Secretary of each society represented at this meeting be appointed sub-committees to obtain from their respective societies subscriptions towards the establishment and support of the Zoological Station at Port Jackson."

Dr. Ralph seconded the proposition, and suggested that the Medical Society be invited to join in the movement.

The proposition was carried unanimously.

Mr. E. Howitt was then appointed Treasurer to receive all subscriptions, and the meeting terminated.

ORDINARY MEETING

The ordinary meeting of the Royal Society of Victoria, postponed owing to the Easter holidays, was held on Thursday, 28th April. There were several names for ballot as new members, but as the attendance was less than required by rule, the ballot was postponed.

The President, Mr. R. L. J. Ellery, F.R.S., occupied the chair, and stated that there were two papers to be read, but as they were mainly of a technical character they would be taken as read and handed to the publishing committee. The first was a short paper by Dr. James Stirton, F.L.S., describing a new genus of Lichens, *Trichocladia Baileyi*, being the only species at present known. This was discovered by Mr. F. M. Bailey, of the Queensland Museum, during the wet Autumn of last year, growing among the grass about Brisbane. It has evident affinities with the *Cladonia*, but with peculiarities that necessitated the erection of a new genus.

The second paper was by Mr. F. M. Bailey, F.L.S., describing a new form of *Nipa* discovered by Mr. Arthur Neame, on the East coast of tropical Queensland. The genus *Nipa* is of great botanical interest, as furnishing a representative of the *Pandanaceæ* with divided leaves; the only species hitherto known being *Nipa fruticans*, Wurmbr, a palm of great beauty and large size. The new form—named after its discoverer, *Nipa Neameana* has leaves 25 to 30ft. long, of which each plant carries six or seven: each leaf is divided into 50 to 60 pairs of pinnae two to four feet long. This grand plant must form an object of great splendour in the salt marshes on the sea-coast where it flourishes, and furnishes additional proof that the vegetation of tropical Australia is exceedingly beautiful.

Appended to this paper was a note describing the inflorescence of *Nepenthes Kennedyi*, F. v. Müeller, which had not been seen previously to its flowering this year in the plant-house of the Acclimatisation Society, Brisbane.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held its ordinary meeting on Thursday, 28th April. The Rev. J. J. Halley occupied the chair, and there was a fair attendance of members.

Dr. Whittaker and Dr. Phillips were duly elected members, and Mr. J. R. Remfry was nominated for ballot at the next meeting.

The Rev. Arthur Creswell read a paper on "*Eozoon Canadense*, Its probable place in Classification." This was a *resume* of the arguments for and against its organic character: the subject being of especial interest, as, if it be really a fossil organism it carries back, according to the usually received geological theory,

the existence of organic life on the Earth to a period long anterior to the time generally supposed; for until the discovery of the *Eozoon* in the Laurentian series of Canada the Cambrian rocks were universally regarded as the Primordial Zone of the appearance of life, and all below this series were called Azoic rocks, or rocks without traces of life. A fine specimen slide of the *Eozoon* was laid on the table, and was viewed with much interest by the members present. Considerable discussion ensued, but the prevalence of opinion seemed to be in favor of the inorganic nature of this curious object.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of this Club took place at the Temperance Hall, Russell street, on Monday evening, 11th ult., about thirty members being present, the Rev. J. J. Halley occupying the chair. A ballot was taken for Messrs D. Sullivan, F. Tisdal, and P. Mackay, who were duly elected as members, and Mr. H. C. Campbell was nominated for membership.

The Secretary reported that the Club had been invited to attend a meeting of the Royal Society to consider a proposition to aid the establishment of a Zoological Station at Sydney. Several members attended the meeting, and the President and Secretary had been appointed a sub-committee to obtain subscriptions. He would therefore be ready to receive subscriptions from members favorable to the scheme.

Messrs O. A. Sayce and E. Bage were duly elected to audit the accounts and balance-sheet to be presented at the annual meeting to be held on the 10th May.

A circular was received from the Smithsonian Institute, which the hon. secretary was instructed to fill up and return, in accordance with the request made.

Mr. H. Watts gave notice of the following alterations and additions to the Rules of the Club:—Rule 2, after the word "excursions," the words "formation of a library," to be added. Rule 6, the word "librarian" to be added after the word "treasurer;" and figure "5" to be substituted for "6." New rule to follow after No. 8: "The Librarian shall have the custody of the Library, Specimens, and Objects, the property of the Club."

The following members gave notice of their intention to exhibit at the *conversazione* to be held on Tuesday, 17th inst., viz., Messrs French, Lucas, Bailey, Sayce, Barnard, McKibbon, Dixon, Bage, Kershaw, Le Souef, Wisewould, Watts, Leith, Halley, and Best.

Mr. Best read the continuation of his description of Victorian Longicorn Beetles, and Mr. Goldstein read the continuation of Mr. French's paper on "Victorian Ferns and their Habitats."

Mr. F. A. Leith followed with the continuation of his paper on the "Description of the various Breeds of Dogs." A rather lively discussion followed the reading of this paper, some of the members objecting that the paper contained nothing relative to the natural history of the dog, but dealt only with the subject from a dog-fancier's point of view, and that such a paper did not come within the class of objects for which the Club was formed.

The following exhibits were laid on the table:—*Cyprea sulcidentata* and *C. tessellata*; two rare shells from the South Seas, by Mr. J. F. Bailey; and specimens of *Coleoptera* and *Lepidoptera*, by Messrs J. E. Dixon and D. Kershaw.

The usual *conversazione* closed the proceedings.

NATURALISTS' FIELD CLUB OF N.S.W.

On Saturday, 19th March last, about fifteen members of this Club made an excursion to Shell Cove (Hungary Bay, North Shore). The party went by skiff, reaching Shell Cove about 3.30, and on arrival removed and examined about three yards of camp debris from a large rock-shelter on the east shore of the Bay. Some well-preserved kangaroo, wallaby, opossum, and fish-bones were obtained; also a very well-kept shell ornament.

The monthly general meeting of the Club was held on the 1st ult., on which occasion Mr. Fred. Barkas read a paper on the "Collection and Preservation of Insects."*

Mr. Henson exhibited some interesting fossils from the cutting for the Great North Railway.

Mr. Paterson exhibited an aboriginal stone axe-head, with transverse lines showing the way in which it had been ground.

A sub-committee was appointed for arranging field excursions. The next excursion will probably be to dig out another aboriginal camp. Sydney harbour abounds with these camps, many of the best not yet having been touched.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual meeting of this society was held on Tuesday evening, 5th April.

Donations to the library were laid upon the table as follows:—"Bulletin of the Museum of Comparative Zoology at Harvard College," vol. viii., Nos. 1 and 2; "Southern Science Record," No. 4; "Proceedings of the Physico-Medical Society of Würzburg;" "Proceedings of the Natural History section, Imperial Academy of Sciences of Vienna," for January, 1881; "Proceedings of the Natural History Society of Prussia."

In reference to some remarks made at the last meeting by the Assistant-Secretary, Professor Tate mentioned that Baron N. de

* Published in present issue.

Mielouho Maclay had, in a paper to the Linnean Society of New South Wales, alluded to the external organs of the Port Jackson shark, or made reference to some works extant upon the subject. In reference to the paper upon "The Destructive Potato Moth," there was a communication in the proceedings of the Linnean Society of New South Wales, by Mr. Merrick, some time ago, in which full details were given. He had sent the specimens forwarded by Mr. J. G. O. Tepper, and Mr. Merrick had no doubt that they were identical with *Lita solanella*, the species described by him. He also showed the lower jaw of an extinct species of wombat, obtained from the drainage works near Islington. This he thought to belong to the same species as the skull previously found in the drift at the Willows, near Adelaide. He next showed a bat which he considered to be *Myctophilus Geoffreyi*, a species not hitherto recorded amongst the fauna of South Australia. It was caught by Mr. G. D. Scoular at Smithfield. Mr. J. G. O. Tepper had sent him a species of snake which he had taken near Ardrossan amongst the grass tussocks. It was commonly known, but he considered it to be *Typhlops bituberculatus*. He then read extracts from the papers announced for the evening: "The Butterflies of South Australia," by Mr. J. G. O. Tepper; "Geological Notes about Saddleworth," by M. G. D. Scoular; and "Mosses, &c., of South Australia," by himself. The paper on butterflies provoked a short discussion, in which Dr. Gaze said he had found one or two species not mentioned in the paper, and promised to communicate with Mr. Tepper upon the subject with a view to making the list more complete.

NOTES, MEMORANDA, &c.

From *Engineering* (March) we take the following:—

"**RADIOPHONY.**—M. Mercadier, who is at present engaged in making a study of the sonorous effects produced on bodies by the impact of an intermittent ray of heat, has constructed an apparatus which he calls a thermophonic pile or multiplier, after the thermoelectric pile or multiplier. It consists of a set of glass tubes, either blackened interiorly or containing strips of smoked mica. Each element of the pile is formed of a tube five or six centimetres long and a few millimetres internal diameter. By means of acoustical tubes of india-rubber or metal the ends of these tubes are connected together, either in series for intensity or *en surface* for quantity, like ordinary voltaic batteries; and the thermophonic effect of the radial heat falling upon them is thereby multiplied. An ordinary gas-flame, or a platinum spiral, heated by the electric current, gives loud and distinct tones with this contrivance. The tubes vibrate longitudinally in nodes and segments, and M. Mercadier is of opinion that they will furnish a new means of repeating Dulong's experiments on the velocity of sound in air and gases."

"A thermometer for indicating the temperature at a distant place by means of electricity has been devised by Mr. J. Hicks, of Hatton Garden. A series of platinum contact wires are fused into the stem at equal intervals of 3deg. Fahr. for any range of scale which may be desired. The bore of the tube above the mercury column and a bulb at the top of the stem are partly filled with glycerine. A platinum wire, fused into the mercury bulb, is connected to one pole of a voltaic battery, the other pole of which is connected to "earth." If, now, we suppose a wire, in circuit with an electric bell and "earth," to be fused into the stem, the bell will ring if the circuit be completed by the mercury column. If however, the column has not risen sufficiently high for this, the bell will remain silent. This passage of the bell wire over the series of platinum contacts is effected by means of a dial and a revolving arm. The contacts are connected to a row of studs round the rim of the dial, and the bell to the arm, which revolves by clock-work. As soon as an observation of temperature is required, the arm is started, and passing rapidly in succession over the studs, the bell indicates what stud the mercury column has failed to reach, and hence the temperature."

Mr. W. A. Haswell, M.A., attached to the Australian Museum, Sydney, has been engaged in arranging and classifying the Crustacea of Australia, and has already published several papers describing new species. These have appeared in *The Annals and Magazine of Natural History*, and in the *Transactions of the Linnean Society of New South Wales*. Mr. Haswell is anxious to compile a full catalogue of all Australian species, and has already secured the assistance of collectors in each colony. It has occurred to us that other collectors would willingly aid the work. We undertake to be the medium of communication for these. If they will collect and forward specimens to us we will send them to Mr. Haswell, who will return names of specimens forwarded, and give any information on the subject that may be desired. There are many new and common varieties in this part of the world, and considering how easily they may be collected and preserved it is hoped that many of our natural history collectors will give their attention to the matter. They may be collected anywhere along the coast, on decaying sea-weed, under stones, and in rocky pools, while many varieties may be secured by a simple trap. For this any old basket or box will suffice. The latter should have the open top finished on the principle of a cray-fish pot: nail a piece of wire netting over the top: make a hole in the centre, and turn the edges inwards, thus allowing of easy ingress, while all egress is prevented. The bait, fastened inside to the bottom of the trap, should be strong and savory; a bullock's liver or any kind of meat will suit admirably: if a little "high" all the better. If the trap be then weighted with stones and lowered by a stout line into any rocky pool along the coast, and left for several hours, many curious varieties will be caught. These if small should be placed at once in bottles containing methylated spirits, and then forwarded to us. The same traps will often secure fine specimens of the carnivorous mollusca, such as *Voluta*, *Purpura*, *Murex*, and many others. These we will also be glad to receive, alive if possible, and will undertake to return names of any species sent.

THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, JUNE, 1881.

FAMILIES OF COLEOPTERA, OR BEETLES.

By W. H. WOOSTER.

[Member of the Microscopical Society of Victoria.]

PART III.

THROSCIDÆ.—(*Trixagidæ* of Masters' Catalogue).—*Shape*, ovoid, narrowed behind. *Head*, vertical, retractile in thorax. *Antennæ*, 11 jointed, received in grooves of thorax. *Legs*, short, contractile. *Feet*, five-jointed, one or more joints with flaps below. *Abdomen*, of five segments. *Prosternum* or chest-plate, produced in front to form a chin-piece. *Prosternal spine*, flat, received and fixed in sternal notch. These are of small size, and obscure color. Only one species appears to have been found in Australia yet.

EUCNEMIDÆ.—*Shape*, oblong and cylindric. *Head*, vertical. *Upper lip*, generally indistinct. *Antennæ*, inserted on face, 11 joints. *Legs*, not for digging. *Feet*, five-jointed, with or without flaps. *Abdomen*, of five segments. *Eyes*, round. *Prosternal spine*, received in notch of mesosternum, and moving freely in it, but the insects cannot jump like the next family. These are much like the Elateridæ; scarce any exceed $\frac{1}{2}$ in. in length; and their colors are obscure. Some have the antennæ beautifully pectinated. Fifteen Australian species are catalogued. They are found on trees and under bark.

ELATERIDÆ.—*Shape*, oblong to linear, narrowed behind, firm. *Head*, sloping, seldom vertical, sunk in the thorax to the eyes. *Upper lip*, distinct. *Antennæ*, inserted near anterior edge of eyes, 11 or 12 jointed, dentate, flabellate, or linear. *Legs*, not for digging. *Feet*, five-jointed, often with flaps. *Abdomen*, of five segments. *Prosternum*, with a chin-plate; posterior *spine*, compressed, moving freely in notch of mesosternum, by which they can jump up if laid on the back. *Thorax*, angular and spined behind, with grooves below for the antennæ. *Size*, $\frac{1}{8}$ to 2 in. *Colors*, generally dull, some with red or yellow, and a few metallic. Found under bark, on trees, shrubs, and flowers, and flying at night. Over 150 species are credited to Australia.

CEBRIONIDÆ.—*Shape*, oblong, or oblong ovate, firm, arched above, deflexed in front. *Head*, mostly sloping. *Upper lip*, distinct. *Antennæ*, of 11 joints, filiform, inserted under edge of face near the eyes. *Legs*, for digging; *shanks*, dilated. *Tibial spurs*, large. *Feet*, with five joints. *Abdomen*, five or six-jointed. No chin-plate. *Colors*, dull. *Size*, $\frac{1}{2}$ to 1 in. Found on the ground and on shrubs. One species is credited to New South Wales.

CEROPHYTIDÆ.—*Shape*, ovoid. *Head*, small, sloping, retractile. *Upper lip*, indistinct. *Antennæ*, inserted between the eyes on a prominence of the face, 11-jointed, flabellate in the male, dentate in the female. *Feet*, five-jointed, joints dilated, with flaps. *Abdomen*, of five segments. *Prosternum*, with a chin-plate. *Claws*, denticulate. Lacordaire gives only one genus in this family, which appears to be found only in Europe and North America. I know nothing concerning their size, color, or habits.

RHIPICERIDÆ (*Rhipidoceridæ* of Masters' Catalogue).—*Shape*, oblong or oblong-ovate. *Antennæ*, inserted at front exterior edge of the eyes, 11-jointed (Westwood says 20 to 40; 11 must be a mistake); flabellate or pectinate. *Feet*, five-jointed, one claw very large and setigerous. *Abdomen*, five, seldom six-jointed. These are found on shrubs and trees; length from $\frac{1}{4}$ to 1 in.; colors generally dull, some prettily spotted. Masters gives 12 species.

DASYLLIDÆ.—*Shape*, oblong to hemispheric, softish. *Antennæ*, inserted just in front of eyes, 11-jointed. *Jaws*, short. *Tongue*, large, membranous. *Feet*, of five joints, or the 4th joint of hind feet rudimentary. *Abdomen*, of five segments. From $\frac{1}{4}$ to $\frac{3}{4}$ in. long. Some are found in reed-stems, others in hedges, &c. Some have thick thighs for leaping. One species has been found in Queensland, another in Tasmania. No doubt there are some in Victoria.

MALACODERMIDÆ—(includes Lampyridæ, Telephoridæ, and Melyridæ, of Westwood).—*Shape*, linear, oblong, ovate, or hemispherical, soft. *Eyes*, generally entire. *Antennæ*, 11, seldom 10 or 12-jointed. *Feet*, five-jointed, no flaps; some males have four joints in fore feet. *Abdomen*, of six or seven segments. *Size*, $\frac{1}{8}$ to 1 in. *Colors*, often bright, green, yellow, red, &c. Found on flowers, shrubs, trees, and logs, under bark, &c. Over 50 Australian species have been described.

CLERIDÆ.—*Shape*, linear to oblong, often cylindric, firm or soft. *Head and thorax*, mostly narrower than elytra. *Mentum* generally square or trapeziform. *Labial palpi*, often larger than maxillary. Last joint of *palpi*, mostly securiform. *Jaws*, dentate. *Eyes*, mostly emarginate. *Antennæ*, 11-jointed, rarely less, flabellate, dentate, or clavate. *Feet*, five or four-jointed, with flaps, one or more joints dilated. *Abdomen*, with five or six segments. *Size*, $\frac{1}{8}$ to $1\frac{1}{2}$ in. long. *Colors*, generally pretty, often metallic. Found on flowers, trees, and shrubs, and under bark and wood, &c., sometimes in beehives. The named Australian species already exceed 100.

LYMEXYLONIDÆ.—*Shape*, long, linear; softish. *Head*, not covered, with a neck behind. *Antennæ*, 11-jointed, inserted at front edge of and a little below the eyes, short. *Feet*, five-jointed, long, very slender. *Abdomen*, of five to seven segments. *Elytra*, in some very short. *Maxillary palpi*, very much developed in the males, pendent and flabellate. *Size*, $\frac{1}{2}$ to $1\frac{1}{2}$ in. *Colors*, dull. Found on shrubs. Masters gives but one species for South Australia and another for Tasmania; but I have taken two specimens in Victoria, though I cannot say whether they belonged to either of the above species.

CUPESIDÆ.—This family has but one genus, *Cupes* of Fabricius, one of the most ambiguous of all *coleoptera*, at first sight appearing to be

near neighbors of *Cucujus* and its allies, by the very depressed form, and especially the head; but the mouth is otherwise made, and the form and mode of insertion of the antennæ, the structure of the legs, their integuments being very scaly (except in *capitata*), all show this to be an analogy and not a real affinity. To the above translation of Lacordaire's indefinite characters, whose whole work is in French, I can only add that the genus has been found in North and South America.

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

ANNUAL MEETING.

The thirteenth ordinary, and first annual, meeting of the above Society was held at the Temperance Hall, Russell street, on Monday evening, 9th May last, at which there was an attendance of about thirty members, the chair being filled by the Rev. J. J. Halley.

The minutes of the previous meeting were read and confirmed, and a ballot was taken for Mr. H. C. Campbell, who was duly elected a member of the Club. Mr. Patton was nominated for membership.

It was resolved that the best thanks of the Club be tendered to the Royal Society for kindly granting the use of their hall for the annual conversazione.

A sub committee, consisting of Messrs Leith, French, Bailey, Watts, and D. Kershaw, was appointed to superintend the annual conversazione.

The Report and Balance-sheet were read and adopted, there being a fair balance in favour of the Club.

On the motion of Mr. H. Watts, the Committee was reduced to five instead of six members, and the office of Librarian was created, Mr. Watts being appointed thereto for the ensuing twelve months.

The office-bearers elected for the ensuing twelve months are as follow:—President, Professor McCoy; Vice-Presidents, Rev. J. J. Halley, and Mr. J. R. Y. Goldstein; Treasurer, Mr. E. Howitt; Secretary, Mr. D. Best; Librarian, Mr. H. Watts; Committee, Messrs C. French, Dr. Lucas, T. A. F. Leith, J. G. Luchmann, and D. LeSeuf.

The evening being chiefly occupied with the annual business, no papers were read, and there were few exhibits. Mr. J. F. Bailey exhibited a fine specimen of a worn stone—a perfect oval in shape—found at Harrietteville, at a depth of about 60 feet; and Mr. C. French showed a new orchid recently found by him near Brighton, and named by Baron von Mueller *Pterostylis aphylla*. Messrs French and Lucas also exhibited some fine specimens of *Lepidopterous* insects.

ANNUAL REPORT.

“In presenting their first Annual Report, the Committee have much pleasure in congratulating the members upon the success that

has attended the efforts to establish in Melbourne the Field Naturalists' Club of Victoria, a success which must have far exceeded the most sanguine expectations of the promoters. The roll now comprises over 120 members, besides several honorary and honorary corresponding members; and it is both hoped and expected that during the ensuing year this number will be still further augmented.

"With the view of more extensively popularising the study of Natural History the Honorary Secretary has been requested to forward copies of the Rules, and all information relating to the doings of the Club, to the various mechanics institutes, public libraries, &c., throughout the Colony, and from these sources it is fully anticipated that not only will many new members be secured, but it will be the means of securing to the Club a number of interesting papers, as also valuable information.

"During the year the monthly meetings have been exceedingly well attended; although the same can scarcely be said of the Field Excursions. The Committee would strongly urge the members to take more advantage of this means of acquiring practical knowledge, as well as spending many a pleasant afternoon. This request of the Committee will doubtless have due weight, and meet with a ready response, as the members cannot now plead the excuse of the superior attractions of the International Exhibition.

"By a perusal of the proceedings of the Club it will be seen that many of the members have contributed valuable papers on some of the principal branches of Natural History, but it is to be regretted that, so far, we have been almost without exponents of Geology and Ornithology; there can, however, be scarcely any doubt that these vacancies will be shortly filled up, as the Committee feel convinced it is from a little natural diffidence that those members who make these branches their peculiar study have so far failed to come forward and give the Club the benefit of their knowledge and experience.

"The Treasurer's statement shows that, after the payment of all expenses, and allowing for present liabilities, there is a balance in hand with which to commence the year of about £5, to which may be added several subscriptions still to be received. The ordinary outlay for the year now commencing will not be nearly as large as the present one, so that there is every probability of the Club being very shortly in a position to proceed with the formation of both a Library and General Collection. For the former there is every reason to believe many publications will be contributed, as soon as it is known that the Club is in a position to receive them.

"In conclusion, the Committee would express a hope that during the next twelve months each and every member will make it his especial endeavor to maintain the efficiency of the Club by a regular attendance at the meetings, by contributing papers (no matter how humble his efforts), and by obtaining for it all the information in his power, having reference to any of the branches of Natural History."

D. BEST, Hon. Sec.



ANNUAL CONVERSAZIONE.

The Field Naturalists Club held its first annual *Conversazione* on Tuesday evening, 17th May, at the Royal Society's Hall (kindly placed at its disposal by the Council), and is to be congratulated upon the great success that attended its efforts to provide an evening's entertainment for the members and their friends, of whom there was a very large attendance. Upon entering the two rooms set apart for the exhibits, it was evident that the one great difficulty the Committee of Management had to contend with was where to place the numerous exhibits so that visitors might obtain a good view of them. Foremost of all, and occupying the centre of the large room, were Mr. J. F. Bailey's cases of Fossils, Shells, &c., a collection so large that before one had time to more than half examine them the bell, punctual to time, rang the President's address. Arriving at the upper Hall, it must have been a pleasing sight to the members, and especially to Professor McCoy, to see so large an audience assembled to listen to what he had to say about the doings of the Field Naturalist's Club. The address, which was very attentively listened to throughout, and heartily applauded at its conclusion, referred in a most appreciative way to the successful meetings of the Club, to the various papers contributed by members, and the discovery of several new fossil shells by Mr. J. F. Bailey, and of two orchids, *Pterostylis aphylla* and *Caladonia fimbriata*, by Mr. C. French. It mentioned that whilst Entomology and Botany were evidently the two most popular branches, the others had not been neglected, and several suggestions were thrown out which will no doubt be availed of by the Club during the present year. It may here be mentioned that most of the papers read at the monthly meetings are published from time to time in these columns. A special vote of thanks was accorded to the President for his address, Rev. J. J. Halley, one of the Vice-Presidents, gave, in a humorous manner that at once placed him on the best of terms with his audience, a short and interesting lecture on the lowest and most ancient forms of animal life, the *Protozoa*, illustrated by some well-executed drawings largely magnified. The short interval which then ensued was devoted by some to the microscopes, of which there were several, contributed by the Rev J. J. Halley, Mr. J. R. Y. Goldstein, and Mr. T. Husband; the majority again resorted to the lower rooms, where Mr. W. Andrews' collection of Birds attracted a good deal of attention, which it certainly deserved, as the skins were in the best of plumage and most carefully preserved, besides having the additional interest of being nearly all Australian. Again proceeding to the Lecture Hall, Mr. Watts was discovered lecturing on that lovely class of plants, Sea-weeds, in which Victoria is comparatively rich, and as this is a subject Mr. Watts thoroughly understands, and as he has an agreeable style of delivery, he soon succeeded in securing the attention of those assembled. The Lecture was illustrated by a large series of beautiful specimens collected and preserved by the Lecturer. This was followed by Dr. Lucas, who gave an interesting description of the manner of collecting and preserving insects, and their various metamorphoses.

The remainder of the evening was devoted to a closer examination of the exhibits, some details of which we now append. Dr. Lucas had a fine collection of bird's eggs and Lepidoptera, all being in a high state of preservation, and the former deserving of especial mention. Another good collection of bird's eggs was shown by Mr. Campbell. In the three large cases of foreign Coleoptera, shown by M. P. Dattari, we observed a fine specimen of *Cetonia*, *Rhomborrhina Ruckerii*, from the Himalayas, also one of *Longicornes*, *Macrodontia cervicornis*, from Cayenne. A fine group of Goliathus beetles, including *G. Burkei*, *G. Derbyana*, and *G. polyphemus*, was exhibited by Mr. C. French, as also a case of very rare moths, and one of *Phasmidæ*, amongst which was *Acrophylla titan*, New South Wales, also a full collection of dried Victorian Ferns and Lycopods. Miss Guilfoyle's exhibit of Fish, Saurians, &c., in alcohol received a good share of attention, as did the Reptiles of Messrs Wisewould and Best. The latter also showed his entire collection of Victorian Longicorn Beetles, comprising 150 species, some of them being very rare. Mr. Leith, in addition to some fine specimens of mounted birds, had a natural curiosity in the shape of a rabbit with tusks, shot by him in Suffolk some few years since. Another natural curiosity was a white hare exhibited by Mr. A. Coles, of Kyneton. Entomological collections were shown by Messrs J. E. Dixon, F. J. Barnard, and D. Kershaw; and, as showing what an extensive field Victoria offers to the entomologist, it may be mentioned that all these were taken in the immediate vicinity of Melbourne. Two collections of ferns were exhibited by Mr. F. Pitcher, and Mr. E. Howitt, that of the former consisting of 58 species of Victorian, the latter being mostly British. A very rare orchid *Pterostylis vittata*, of which only one has been previously taken, viz., at Wilson's Promontory, was shown by Mr. C. Walter, who was fortunate enough to secure it at Brighton quite recently. Mr. J. F. Roberts exhibited a healthy specimen of an orchid in flower *Cypripedium insigne* var. *Maulei*, being a great improvement on the old and well-known species. A case of birds by Mr. W. Slater, and a New Zealand ground parrot by Mr. D. Le Scœuf, completes a list of most interesting and varied exhibits. About 10 o'clock the company began to disperse, having spent a very pleasant and instructive evening, hopes being expressed that the next conversazione would be as successful and enjoyable.

THE PRESIDENT'S ADDRESS.

LADIES AND GENTLEMEN—The completion of the first year of the existence of the Field Naturalists' Club of Victoria affords me the pleasant opportunity of addressing my hearty congratulations to the members on the success which has attended the establishment and operations of the Club to this anniversary of its opening.

Started in May last, the Club now numbers one hundred and twenty members, besides honorary and corresponding members, amongst the latter counting Dr. Hector, the Director of the Geological Survey of New Zealand, so well-known for the enlightened zeal with which he advances the knowledge of every branch of Natural Science and secures great honor for the Government of his Colony by the publication of the observations on all branches of Geology, Botany, Zoology, Meteorology, and the chemical analyses made in

connection with the public scientific establishments which have been founded on his recommendation: also the Hon. W. M'Leay, of Sydney, who (and others of his family before him) give to New South Wales the honor of having the finest private entomological collection in the world, as well as the most learned entomologists in their owners: also Mr. Ramsay, now Curator of the Sydney Museum, the most active of the Australian ornithologists, and whose extensive observations on the eggs of the birds of N. E. Australia, and other subjects, are so well-known: likewise Mr. J. G. Waterhouse, Curator of the South Australian Museum at Adelaide, an accomplished naturalist in many branches: and that genial gentleman, and untiring observer and writer on Geology and many branches of Botany and Zoology of Australia and Tasmania, the Rev. J. E. Tenison-Woods, who, like so many others of the famous order of the Society of Jesus, combining the most laborious and conscientious devotion to his clerical duties, with high attainments in Science and Literature, and his singular diligence in applying them to the enlargement of our knowledge of the natural productions of every Australian locality which has been fortunate enough to have him for even a short time, has rendered his name a household word amongst us "hereabouts and far a'wa." Our own Alfred Howitt is another of our associates of whom any scientific society in any part of the world might be proud; one of the toughest, most active, courageous, and enterprising bushmen, combining the duties of a police magistrate over a district of almost impassable mountains and impenetrable forests as large as a European principality, with the most admirable field geological surveying, and microscopic researches in the study of the structure of the igneous rocks, which have done so much for the geology and lithology of Gippsland. Besides the glorious company of honorary and corresponding members, many of our ordinary members are not only well-known as accomplished naturalists, but lovers of the open air studies and excursions for the purpose of making and recording observations which are the main characteristics of our Club.

MEETINGS OF THE CLUB.

The monthly meetings have been well attended, and at each there has been a most interesting exhibition of specimens and preparations brought together by the members of the Club; and at each meeting several papers have been read on the most varied subjects included in the objects of the society. For instance, our industrious colleague Mr. C. French, so well-known for his entomological collections, has given an extensive and excellent paper on "Victorian Ferns and their Habitats," in which not only his practical knowledge of these plants enabled him to afford a fund of information, but the unexpectedly near and accessible situations in which many supposed rarities might be had were indicated as inducements to our members to put their best legs foremost on the first opportunity. Mr. J. G. Luehmann gave a paper on our *Eucalypts*, of which Baron von Müller is now publishing such a noble monograph for the Government, illustrating such an astonishing number of species growing within our Colony. A paper on Victorian Sea-weeds by Mr. H. Watts continues for the waters near Melbourne those acute observations, and energetic

successful collecting labors which rendered his name many years ago so familiar to readers of the works of my old friend Professor Harvey, of Trinity College, Dublin, on the Australian Algae, to which Mr. Watts contributed many new species and observations from another part of the Australian coast. The paper by our excellent Secretary Mr. D. Best on "Longicorn Beetles of Victoria" showed in a striking way the extraordinary abundance and variety of the genera and species of these destroyers of our forests of timber trees. It is certainly a singular circumstance that a country in which such numerous timber eating larvæ abound should be entirely destitute of their natural enemies, the woodpeckers, who act as such efficient "conservators of forests" in all other countries. As yet no remedy for these pests has been found, but probably this Club, by ascertaining the exact time and manner of depositing the eggs of the various species, might aid in the solution of this difficult but important problem. The paper on the "Germination of Ferns," by Mr. J. R. Y. Goldstein, shows the versatility of one of our best microscopic observers in many branches of marine zoology. And the paper "On some forms of Animal Life in Fresh-water Pools," by Mr. E. Bage, opens up an inexhaustible field of interesting research, easily accessible, full of curiously wonderful generic or specific forms even at home, and here just as singular and varied, with the additional attraction of being, in the majority of cases, new to science. The paper on "Victorian Shells," by Mr. J. F. Bailey, enables me to congratulate a most successful shell collector, who, in his occasional leisure time, has so well succeeded in his investigations as to have not only acquired a multitude of examples in the finest condition, but has added several species to the National Museum collections not previously represented there, and earned the distinction of having had some new species he found named after him by the Rev. Mr. Tenison-Woods. Mr. F. J. Williams' paper "on the Platypus" reminds me that the veteran anatomist Professor Owen is still writing out to his friends here to get him specimens nearer to the time of bringing forth the eggs or young than he has yet had, to assist in determining the as yet unsettled question of whether this most strange animal be oviparous or not: and there is scarcely a question in Victorian Natural History which would excite greater interest at home than this, which peculiarly belongs to the Field Naturalists' Club, of determining the earliest condition of development in which the young may be found in the burrows. The paper "on the Lyre Bird and Marsupials of Australia," by Mr. F. J. Williams, deals with subjects of perennial interest to naturalists, at home and here, who of all things desire records of more numerous observations in the field to illustrate and explain the curious peculiarities of structure in these creatures with which they have become acquainted in the study. The paper "on the Natural History of Dogs," by Mr. T. A. F. Leith, is perhaps not so racy of the soil as most of those by our members, although the history of our domestic animals must always be one of peculiar interest and difficulty from the changes produced by the influence of man, and from the uncertainty concerning the true native source or original type of most of them. The Australian dog, or dingo, has been indicated by a great English authority (I think erroneously) as one of these sources. The paper entitled "An En-

tomologist's trip to Healesville," by Dr. Lucas, exemplified the remarkable difference which all good field observers have noted in the Flora and Fauna of the ranges as compared with the greatly more extended nearly uniform plains and general surface of the Colony at the lower levels. Not only will the members of our Club find many peculiar species of insects, and shells, and plants, on these ranges, but also a greater extension along these lines of New South Wales species than on the lower country on either side of them. The proximity of these ranges to the city offers a great inducement to members of the Club to extend their observations into "fresh fields and pastures new," full of variety, much of which is as yet unrecorded.

On the occasions of the evening meetings, at which these papers were read and the specimens referred to were exhibited, the descriptions were of the highest interest, and showed most pleasantly the advantages of men of scientific tastes and acquirements uniting together to describe the many new bearings of fresh observations which it is the object of this society to make.

FIELD WORK.

It has been remarked that Geology has not had its fair share of attention from the members of the Club in their excursions, and yet there is a great deal of interesting geological observation and collecting to be done in the vicinity of the city, or within moderate excursion distances by rail, or coach, or steamer. The city stands partly on tertiary and partly on the upper Silurian formations of the age of the Ludlow and Wenlock formations of England and Wales. Close to the Flemington Toll-gate, a little north of the city, the quarries of the red sandy deposits, of the color and age of the Red Crag of England, are full of fossils of types of shells, fish, &c., specifically differing from any in our seas now. The same formation may be traced south to Mordialloc, where it is full of peculiar *Echinodermata*, the *Lovenia forbesi*, filling entire beds at that place, where also our member Mr. Bailey discovered the tooth of the great extinct spermaceti whale named after him *Physetodon Baileyi*. Other beds contain layers of the tooth of the great gigantic extinct sharks *Characodon megalodon*, sometimes four to five inches in length, indicating a shark of about one hundred feet long: other shark's teeth, as *Otodus Desori*, *Lamna*, &c., are found in equal abundance, and many interesting fossil shells, &c. The Silurian formation from the sandstone quarries between Princes' bridge and the Botanic Gardens, to the bed of the stream in the Royal Park, is full of fossils, many of them identical with those of Wales, while one layer is full of peculiar fossil star-fishes, some like those of the European Ludlow and Wenlock forms, and some others peculiar to this country. In these Silurian beds in the Royal Park was also found the first Australian example of that extraordinary genus of Trilobites *Homalonotus*, discovered by Mr. Harrison and named after him *H. Harrisoni*, and no doubt many other discoveries await a visit from members of the Club. To the Geologists desirous of investigating Lithology, the igneous rocks afford a great variety of subjects of investigation, one colonial observer of microscopic sections of our igneous rocks, Mr. Howitt,

having distinguished himself. Over the Keilor Plains, and all those stretching towards Geelong, you have a great overflow of basalt from the extinct volcanos near Ballarat, as well as from fissures, and this extends with the general fall of the lava towards the sea as far as Melbourne, covering over the pliocene tertiary gravels. On the surface of these plains you get all the variety of lava just as about Vesuvius, and occasionally Obsidian or volcanic glass, as in the active volcanic regions of the Pacific; while in the quarries near Richmond you find, in addition to columnar basalt, like that of Staffa on a small scale, a great variety of rare zoolitic minerals in fine crystals lining holes in the basalt, or bluestone as it is colonially called. Many interesting minerals, including sapphires, topazes, and other precious stones, are common in the beds of streams coming from the Dandenong and other ranges. In fact the hands of geologists need be no more idle than those of other members of the Club, who certainly have hitherto left Satan but little for his mischief-making endeavors with such materials. There is one extremely interesting subject for the collectors, I should mention, to be found under the basalt in a few excavations near Flemington, namely, a bed of fine white clay full of fossil leaves of extinct plants, all of which are sure to be new, and almost any specimens would help to make up the defects of those previously obtained. A similar leaf-bed, which would well reward a visit from geological members of the Club, is to be found in a paddock near where the old coach started from for Berwick. A red flaggy bed full of beautifully preserved leaves of large deciduous trees occurs near Bacchus Marsh. Then if the excursionists venture as far as Geelong on one side, or Mornington, between Mount Martha and Mount Eliza, on the other, exceedingly rich tertiary formations of older date full of fossils are to be found, which would give a good collection in a day of fossils as varied, beautifully preserved, and easily obtained as those of the Barton cliffs on the Hampshire coast, to which they bear a strong general resemblance. In Ornithology also there is much to be done in observations of habits, and in accurate determination of nests and eggs, which affords subjects that can only be accurately investigated by a Field-club, and which are the chief additions which my late friend Mr. Gould has left for the colonists to add to the Ornithology of Australia, and which our Club may be expected to do for this Colony.

EXCURSIONS.

The Field days of the Club have, on the whole, been well attended considering the busy times which most of us have in this Colony. From the unfailing beauty of the weather, the charming and varied nature of the different localities visited on successive occasions chosen for the meets at easy distances from town by coach or rail, the excursions have been full of social enjoyment and healthy recreation, as well as singularly successful in the scientific objects of the Club. These results show how rich and inexhaustible the field is for the useful operations of our association. Who could have imagined that new fresh-water Polyzoa would be found in the lakes in the Botanic Gardens, or that a short excursion to Cheltenham and Brighton, a few miles from town, two conspicuous and singular plants

could be added to the Flora of the Colony by our member Mr. Charles French, as happened during the past year. The one from Cheltenham was the orchid *Pterostylis aphylla*, and the other the *Caladenia fimbriata*, of which hitherto the specimen in the Kew herbarium, from N. W. Australia, was the only one known? Like the excursions of the British Association, a time and place of meeting being arranged, the members, after assembling, disperse a little or keep together according to the different branches of science they cultivate, while availing themselves of the opportunities for practically collecting specimens and making observations in the field; then the social English recognition of the high part which the stomach plays, as a "touch of Nature making all the world a'kin," brings all into friendly union, at the close of the day, and the results are compared of the different observers, increasing the knowledge and enjoyment of all.

CLUB ARRANGEMENTS.

The monthly meetings in town close with an exhibition of specimens and couversations to which visitors are invited; and these have proved a great attraction from the number of beautiful and interesting novel objects brought under the notice of the company assembled, and many additions to the lists of members follow from these glimpses of the work. Some of these collections, as well as a small library, it is intended ultimately to have for the general use of members when suitable permanent chambers can be obtained.

It is intended during future years to devote special attention to the insects and fungi injurious to the vine, the fruit trees, the corn crops, &c., so as to ascertain accurately their habits, transformations, times of appearance, &c., to form a foundation on which to base researches on the means of coping with these destructive pests to the cultivators of the soil; and Agricultural Associations may probably assist the Club in making investigations of such obvious practical value to the Colony. Circulars have been sent to mechanics institutes throughout the colony, in order to obtain information touching the objects sought by the Club in districts too thinly populated to support field naturalists' clubs of their own.

The display this evening shows the large company now present what can be done in a short time by our members in bringing into notice a multitude of interesting objects which could not have been seen without this Association.

I have now to return thanks for the honor the members have done me in electing me to the office of President, and to express my hearty good wishes for the increased success and prosperity of the Field Naturalists' Club of Victoria.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of the Microscopical Society of Victoria was held on 27th May. The President, Dr. Ralph, occupied the chair, and there was a fair attendance of members.

Mr. J. R. Remfry was elected a member.

A circular letter was laid on the table from Dr. Dohrn, of the

Zoological Station at Naples, announcing the forthcoming publication of a series of observations made at the station on the Flora and Fauna of the Bay of Naples.

Dr. Ralph then read some notes on a paper by M. Prinz, of the Belgian Microscopical Society, on Sections of Diatoms. This was very interesting, as the observations were made with a view to elicit information as to the true nature of the markings on Diatoms, hitherto a very vexed question indeed, but which is now likely to be soon cleared of all uncertainty, owing to the method of research proposed by M. Prinz.

THE ROYAL SOCIETY OF VICTORIA.

The Royal Society held its ordinary meeting on Thursday, the 18th of May, four gentlemen were elected, namely Mr. Chesney, Mr. Hiscocks, Mr. Selby, and Dr. Lucas. Two gentlemen were nominated for membership.

Mr. Pirani read a paper which he entitled a "Modification of France's method of determining the internal resistance of a Battery." France's method consists in carrying a current through six wires, the resistances of three of which are known; then altering the resistance of a fourth until the current disappears in the fifth. Then the resistance in the sixth forms the fourth term of a proportion in which the resistances of the first three wires form the first three terms. But these resistances being known the resistance of the sixth wire (including the battery) is known. Mr. Pirani's modification consists in placing a microphone in the fifth wire, in order to detect the moment at which the current in it is completely destroyed. The observer holds a telephone connected with the microphone, to his ear, and when the sounds completely cease in the telephone he knows that the current is zero in the fifth wire.

Mr. Pirani also exhibited a new galvanometer of his own invention, suitable for the measurement of very powerful currents. It consists of two concentric circles of copper with a needle placed in the centre. The current circulates in opposite directions through the two copper circles, and in its two courses tends to turn the needle in opposite directions. But the nearer circle having the greater effect the result on the needle depends on the difference between the radii of the two circles. And as this difference can be made small, the instrument can be so arranged that a powerful current will not produce an excessive deflection of the needle.

Mr. Cosmo Newberry read a paper prepared by Mr. A. W. Howitt, of Gippsland, on the Diabase Rocks of the Buchan district.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

A meeting of the Royal Society of South Australia was held in the Institute on Tuesday evening, May 3. His Honor Chief Justice Way presided. There was a moderate attendance.

Mr. S. Polilitzer, C.E., was nominated for membership.

Exhibits by the Curator of the Museum on behalf of the Governors of the South Australian Institute were laid on the table as follows:—

"Specimens of jaw-bone *Diprotodon Australis*, containing molar teeth, and two upper incisors, lately found and presented to the Museum by Mr. W. N. Pethic, of the Surveyor-General's Department. These were found near Millicent (South-East District) at a depth of six feet below the surface, embedded in peat mixed with shells; also, some specimens presented by Mr. M. F. Weidenbach of the *Amphioxus* or *Lancelot*, from the Mediterranean, a small and remarkable fish of the lamprey family. Its form is compressed, head pointed, without any trace of eyes, a delicate membranous dorsal fin extends the whole length of the back, and the tail is pointed. At one time it was regarded as a mollusc. It is found on the coasts of England and Ireland, in the Firth of Clyde, and in the Mediterranean.

Professor Tate exhibited a portion of a large collection of New Zealand fossils presented to him by Dr. Hector, Director of the Geological Survey of New Zealand, selected chiefly to indicate the close similarity between the older tertiary species of South Australia and those of New Zealand. Several of the exhibited species are common to the two regions, and by them the exhibitor correlated the River Murray beds, the Muddy Creek, and the polyzoal sands of Aldinga Bay with the trellissick group in New Zealand. The latter Dr. Hector assigns to the Upper Eocene; whilst Professor Tate, in his "Outlines of South Australian Geology," places their probable equivalents in South Australia in the Oligocene period, rather in conformity with the Victorian classification than as fixed opinion of his own. The inferior beds of the Aldinga section he has always maintained to belong to the Eocene period. Nevertheless the generalisations arrived at by independent observers touching the period of deposition of the older tertiaries in South Australia, Victoria, Tasmania, and New Zealand do not materially differ one from another.

Mr. G. L. Delaney communicated some notes on the physical features of the country bordering the east side of Lake Eyre, confirmatory of Mr. Lewis's observations on the trend of the sand ridges and associated phenomena. He also indicated the general lithological features of the table-topped hills about Lake Gregory and elsewhere, and particularly referred to a section of one containing fossil bones, situated twenty-five miles north-west of Lake Kilalpaninna. The fossils, which had been placed in Professor Tate's hands some two years ago, consist of fish vertebræ, teeth, and the bony scales of crocodiles, and phalanges of a gigantic marsupial of the family of the kangaroo, from which it may safely be concluded that the marly clays, sandstone, and gypsiferous beds of the table-land country are of lacustrine origin. Five well sections in this district completed the notes.

Professor Tate exhibited a very fine species of sea-shell new to the colony. It is a *Semicassis* allied to *S. pyrum* of New Zealand, collected by the Rev. C. G. Taplin on the coast near Lake Hamilton.

Dr. Gaze laid on the table a specimen which he believed to be a lizard, which had been found upon the sandhills at Glenelg. Professor Tate pronounced the animal to be a legless lizard, and said he had not seen one exactly like it before, although he had seen one with fewer bands.

A paper on the geological and physical history of Cunningham, Yorke's Peninsula, was furnished by Mr. J. G. O. Tepper, F.L.S., and the following is an abstract:—By observing and correlating the various rocks in the Hundred of Cunningham, the greater part of Maitland and adjoining regions, it has been attempted to trace the conditions in a continuous sequence under which the region reviewed existed, from the earliest times of which rock evidence has been preserved to the present. In the introduction the opinion is expressed that the great system of pre-silurian rocks—gneiss, quartzites, slates, &c.,—are of Huronian or Laurentian age, their high state of crystallisation and foliation removing them very far from the known silurian rocks co-existing in the same area with the former. It is contended that this part of Yorke's Peninsula was first raised—by plutonic or volcanic action—above the waters about the close of the period during which the pre-silurian deposits were formed, and remained land during the Cambrian period. Immersed to considerable depths during the early part of the silurian allowed of deposits above 250 feet in thickness, containing such fossils as trilobites and mollusca in some layers. The region was again elevated at about the close of the period, and most probably remained so throughout the Devonian and the whole mesozoic age, no corresponding strata having been discovered either here or anywhere in the southern part of the province, which is also fatal to the anticipated discovery of true coal. Through this era immense masses of sedimentary and plutonic deposits were totally destroyed and removed by denudation so as to uncover the granite considered as primarily the basis of volcanoes, being only capable of forming under extreme pressure and heat. When again submerged in the early part of the tertiary age (Upper Eocene), the fossiliferous clays were formed round the coasts of the lands breaking up into islands, but not totally disappearing. During this time the low ground west of the coast-hills formed a very deep bay with a very narrow outlet. In the miocene era this region appears to have been dry land again—long enough to allow the silicious deposits to become true stone, and to allow a large portion to be removed by denudation. Numerous fragments of petrified wood and the impression of a leaf seem to prove that even in early tertiary times trees flourished in the vicinity. The last submersion took place at about the close of the tertiary era, and to such extent that even the highest hills were submerged, as proved by the almost uniform occurrence of the marly clay termed “Bay of Biscay” over all where not subsequently removed. When re-elevating, the low ground west of the coast hills already mentioned, and for which the name “Cunningham Plain” has been adopted, must have been a deep lake, a swamp, and a marsh in succession as the outflowing waters deepened its blocked-up outlets and the inflowing filled it up with *debris*. At present it is overgrown with dense scrub; the evaporation from the countless leaves of this may account to a great extent for the consumption of the rain-water, of which not a drop reaches the sea superficially. Its elevation above the sea is estimated at about 50 or 60 feet at the most, yet water was only reached in the only well sunk at 90, brackish—*i.e.*, below sea level,—thus prohibiting all direct connection with the sea. A similar case occurs at Yorke Valley. A topographical map (lin. per mile),

and a geological sketch ($\frac{1}{2}$ in. per mile), and three profiles, and corresponding diagrammatical sections served to elucidate the subject. It is only to be regretted that the excessively worn character of the country barely allows to trace the existence of the various rocks, and only seldom permits accurate measurements and other determinations to be made.

Mr. Molineux differed from Mr. Tepper with respect to his conjecture about the subsidence that he alleged was going on. There might be a subsidence in one part and not in another. Mr. J. Buick, of Kangaroo Island, directed his attention to a continual rise in the locality of the American River. The water was much shallower than it had been, and in one place an oyster-bed had been raised so high that the molluscs could not live.

Professor Tate said neither Mr. Molineux's nor Mr. Tepper's impressions might be correct. There was no distinct proof of depression or rising. There might be rising land while the sea was still ploughing away at it. He referred to the Goodwin Sands, which were once part of the mainland of England; also to the waste in the coastline since the Saxon period.

Mr. Molineux mentioned that Preston Rock, at Western Cove, Nepean Bay, was nearer the mainland.

Professor Tate said that might be a fair case in point.

ROYAL SOCIETY OF TASMANIA.

The monthly evening meeting of the Society was held on Tuesday, the 10th May, Mr. Justin McC. Browne in the chair.

Mr. Barnard (Hon. Sec.) laid on the table the usual returns for the past month, viz.:—

1. Number of Visitors to Museum, on Sunday, 356; on week days 685; total, 1,041.
2. Ditto to Gardens, 4,385.
3. Books and Periodicals received.
4. Presentations to Museum.
5. Time of leafing, flowering, and fruiting of a few Standard Plants in the Botanic Gardens during April:—
 - 12th. Common Elm, leaves commencing to fall.
 - 14th. Coe's late red Plum ripe.
 - 15th. Chinese Chrysanthemums commencing to flower.
 - 24th. Mountain Ash leaves commencing to fall.
 - 28th. Seeds of Hornbeam ripe.
 - 60th. Black Mulberry leaves falling.
6. Meteorological returns.—From the Marine Board, tables for April from Bruny Island, Swan Island, and Mount Nelson; Goose Island for February and March.

The Secretary read a paper by Baron von Müller, K.C.M.G., M.D., F.R.S., entitled "Suggestions for an extended elucidation of the Plants of Tasmania."

The Chairman said that it would be seen that Baron von Müller was desirous of getting information upon the botany of Flinders Island; he had already applied to the Society to assist him in this direction, and steps had been taken which would probably result in local assistance being procured in the way sought by the Baron, if

not for Flinders, at least for Clarke's Island; and probably the botany of both islands is nearly the same.

Mr. R. M. Johnston hoped that the local collectors in Tasmania would further the object of the learned Phytologist. It was very desirable that the natural history of the Cryptogams of Australia should be brought up to the same state of perfection as the other divisions of the "*Flora Australiensis*." Mr. Bentham committed the completion of this onerous task to the illustrious Baron, and he (Mr. Johnston) was glad that there was now a probability of its being carried out.

Mr. Stephens read notes on a species of *Eucalyptus* (*E. hæmastoma*), not hitherto recorded in the Flora of Tasmania, with its identification by Baron von Müller. This tree is commonly known as the Gum-topped Stringy Bark.

Mr. Grant expressed his surprise at learning that the Gum-topped Stringy Bark—the subject of the paper—had not been previously described by botanists, since it had long been well known in commerce, and was a valuable timber. He had been supplied with a large number of sleepers of this wood by Mr. Oates, whose mills were near Victoria, Huon River, and, therefore, the trees must abound there. The timber could readily be recognised by those accustomed to notice sawn woods. It had a different shade of colour from stringy bark, and from white or swamp gum, also a different grain, which more nearly resembled that of blue-gum. It was a close, heavy timber, remarkably clear and free from knots, which, independent of the colour, distinguished it from blue gum, that otherwise it most resembled. Mr. Grant had not observed the tree growing, or noticed its wood in any large quantity, in the Midland districts, and therefore, as it was common about the high lands, he thought it probably preferred a more humid atmosphere than obtained in the interior of the country along the course of the railway. There was also another apparent variety which he had heard called "celery-top" gum, but which was probably a slightly modified form of the gum-top stringy bark, since it frequented the same habitats.

The Secretary read a paper by Charles E. Barnard, M.D., etc., etc., "*On Auriferous Country and Gold-bearing Rocks*." [Published in *The Mercury* of the 13th May.]

Mr. Stephens said that the paper which had just been read indicated much thoughtful study on the part of the author, who evidently took a lively interest in his subject. He did not quite understand whether the author intended to mean that the views which he expressed as to the surface indications of the presence of gold were to be taken as universally applicable; but it would be improper to attempt to discuss in detail a paper covering such a wide range after only hearing it once read, and he would only venture to criticise one point which was too important to be passed without notice. The relations of intrusive rocks, especially those of a granitoid character to the primary strata, had furnished matter for innumerable pamphlets and papers; but it might be sufficient to say that although the granite was often found as a disturbing element in Silurian districts, it was clearly proved to have formed no part of the agencies which had produced those remarkable flexures and contortions which are special

characteristics of the primary rocks all over the world, and which were attributable to forces operating on a much wider scale. This question, however, would in itself furnish matter for a lengthy paper.

The usual vote of thanks having (on the motion of Mr. Johnston, seconded by Dr. Perkins) been accorded to the authors of the papers read, and to the donors of presentations, the meeting closed.

THE ROYAL SOCIETY OF NEW SOUTH WALES.

A general monthly meeting of the Royal Society of New South Wales was held at the society's rooms, Elizabeth-street, on the 2nd of June, for the purpose of balloting for new members, to hear two papers read, and to transact general business. Mr. H. C. Russell, the president, occupied the chair, and about twenty-five members were present.

The minutes of the previous meeting were read and confirmed.

Thirty-five donations were announced to have been received, amongst them being reports of proceedings of kindred societies in America, vols. 2 to 6 of the United States Geographical Survey, West of the 100th Meridian; vol. 12 of the United States Geological Survey of Certain Territories; the "Geological and Geographical Survey of the Territories of Idaho and Wyoming"; the Smithsonian Report for 1878, a Report of the proceedings of the New Zealand Institute for 1880, and part 4, vol. 5, of the proceedings of the Linnean Society of New South Wales.

On behalf of the author, Mr. H. Ling Roth, the president read a paper on the climate of Mackay, Queensland. He also on behalf of the author, Mr. W. E. Abbott, read extracts from "Notes of a Journey on the Darling," which were principally descriptive of the watersheds and water supplies in that district. In connection with these extracts, which it is intended to publish at an early date, Mr. Wilkinsons the Government Geologist, made some observations to the effect that they were novel, important to the colony, and interesting. Both authors were thanked for having prepared the papers.

The following new members were elected:—Messrs W. J. Foster, M.L.A., H. E. Barff, James Elliot, Albert Helms, William Reid, and C. J. Roberts.

The meeting then terminated.

The monthly meeting of Section A of the above Society was held at the Rooms, Elizabeth-street, on the 3rd of June, Mr. H. C. Russell (Government Astronomer) in the chair. In the unavoidable absence of Mr. Tebbutt, the hon. secretary (Mr. W. J. Macdonald) read the following paper:—

"I have the honour to report to the Astronomical Section of the Royal Society the appearance of another comet in the southern hemisphere. It has been my custom for some years past, and especially since the appearance of the great comet at the beginning of last year, to scan the western sky in the evening, and occasionally the eastern sky in the morning, with the unassisted eye, in search of bright comets. While so engaged in the evening of the 22nd ultimo, my attention

was attracted, at 6 hours 15 minutes, by a hazy patch of light just below the constellation Columbia, and above the four conspicuous stars known as $\epsilon 4$, $\epsilon 5$, $\epsilon 6$, and $\epsilon 7$, Eridani. It presented the appearance of some of the small clusters of stars which we see scattered along the course of the milky way. From my familiarity with this part of the heavens, I at once suspected the object to be new, and I accordingly pointed a ship's glass which I had at hand to the spot. I thus found the hazy object to be a small comet, close to two stars, of the $4\frac{1}{2}$ and $5\frac{1}{2}$ magnitude the light of the three objects being blended in one to the unassisted eye. Without optical aid I could not detect any trace of a tail; but in the small telescope just mentioned the nucleus was brilliant, and the coma broad and defined. It was remarkable that although I examined the south-western sky some evenings previously I failed to notice the comet. As seen with the $4\frac{1}{2}$ -inch equatorial, there could not be any doubt as to the character of our visitor. The two stars seen in the same field with the comet, by means of the small telescope, turned out to be those designated as $\gamma 1$ and $2 \gamma \text{ cœli}$; and the former or brighter one was fortunately so near the comet's parallel of declination as to serve as a star of comparison. I accordingly obtained eight comparisons with this star by means of the filar-micrometer. Each comparison was observed over one of the two close transit threads of the micrometer, and the nucleus being pretty well seen under illumination, and in a red field, the measures were very good. The star itself is, fortunately, a well-known one, for, apart from the old observations of Lacaille, Piazz, Brisbane, Jonstone, and Taylor, it finds a place in the Washington General Catalogue of 10,658 stars for 1860. It was also observed at Washington so recently as 1875; its mean position for the beginning of that year depends on four observations with the transit circle. The observations on the eve of discovery will therefore afford one of the three positions necessary for a first approximation of the orbit of the comet. On the following day I sent notice of the discovery to the Sydney Observatory, and also telegraphed to Mr. Ellery at Melbourne. I am glad to know that the astronomers at both establishments have succeeded in obtaining some measures of positions. On the evening of the 23rd I employed two comparison stars of the $7\frac{1}{2}$ magnitude, one preceding and the other following the comet, which turned out to be those numbered 1685 and 1722 of Lacaille's Catalogue for 1750. Unfortunately I am unable to find either of the stars in any of the modern catalogues in my library; so I fear we shall have to wait till the close of the year before we can turn the differential measures of that evening to account. The comet itself had become somewhat more conspicuous to the unassisted eye, and some traces of a tail could be made out by oblique vision. The evening of the 24th was quite overcast: but on that of the 25th the comet was again seen on a beautifully clear sky, and was evidently increasing in brilliancy. On this occasion, the tail was traced a little beyond $\gamma \text{ cœli}$ without the telescope, and was, therefore, about two degrees in length. I have been unable to trace it as far as some other observers seem to have done. On the morning of the 26th I rose early to get a sight of the comet, in the south-east, and it was fortunate that I did so, for I was surprised by one of the most interesting spectacles I have ever witnessed. The sky was beautifully clear and brilliant, with the

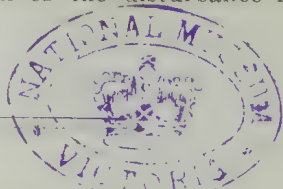
radiation thermometer on the grass down to 27 degrees, and just above the eastern horizon were grouped together, within a circle whose diameter did not exceed seven degrees, the crescent Moon, and the planet Venus, Jupiter, and Saturn. The planets were all conspicuous among their brilliant surroundings, more especially Venus, which is now approaching the most favourable part of her orbit for such observation. A creeping snow-white fog, extending from the base of the Observatory Hill over the low lands to the hills in the distant horizon, also lent its charms to this lovely picture. No observations of the comet were made on this occasion. The evening of the 26th became cloudy, and the weather continued so till the morning of the 28th. On this occasion I succeeded in obtaining one comparison of the comet with Lacaille, 1785; but, before I could complete a second, clouds came from the sea and concealed the objects. This is the last occasion on which I have seen the comet; cloudy weather, with rain, having prevailed up to the present date. It is at present impossible to say whether our visitor is a new comet, or one which has been previously observed. It is, however, satisfactory to the members of the section to know that even now, in the absence of more extended observations, we have positions sufficient to enable us to compute an approximate orbit; but the comet being now the subject of observation for the three observatories at least, it will probably not disappear without our being able to secure sufficient data for a respectable orbit. If, in the absence of any calculation, I may be permitted to venture an opinion, it seems probable that the comet is approaching both the Sun and the Earth. At all events, it will be seen from the differential measures which I have subjoined that it is moving northward and eastward with daily increasing rapidity. In the event of its ultimately appearing above the horizon of the northern observatories, we will be in possession of a long arc for the determination of its path in space. I will now conclude this paper, by giving the differential measures which have been already obtained here. They are, however, as yet uncorrected for refraction; but this correction, it will be seen, is scarcely appreciable in the observations of the first two evenings:—

Windsor Mean Time.		Comet-Star.		Star of Comparison.	No of Measures.
		Diff. App. R. A.	Diff. App. N.P.D.		
	h. m. s.	m. s.	m. s.		
May 22,	6 56 24 ...	1 46'60	+1 2'0	B.A.C. 1573	8
23,	7 1 17 ...	3 16'04	+1 58'4	Lacaille 1722	7
23,	7 35 26 ...	—	+1 53'8	„ 1685	3
23,	7 39 19 ...	+2 18'38	—	„ 1685	2
25,	7 3 37 ..	+4 8'08	7 1'9	„ 1681	7
27,	18 9 42 ...	10 54'86	+7 10'5	„ 1785	1

Mr. Russell exhibited a photograph of the Sun, on a scale twelve inches in diameter, showing the group of solar spots now visible, the particulars of which have already been published. The photograph is full of detail, and more accurate than any sketch could possibly be. Mr. Russell explained that the spots had increased in dimensions since first seen, and rapidly changed shape; and to give an idea of their size, he mentioned that the smallest of the group was sufficiently large to allow of the Earth passing through it.

The Chairman also stated that he had noticed that the northern belt of Jupiter shows a continuation of the disturbance noticed at last opposition.

The meeting then terminated.



NOTES, MEMORANDA, &c.

Owing to the large amount of matter furnished this month, we have been compelled to add to the number of pages in the present issue, and have also been obliged to hold over several items, already in type, including the Report of the annual conversazione of the Geological Field Naturalists' Club. These will appear in our next issue.

A correspondent in Tasmania has been kind enough to send us, barely in time for this notice, a full report of the meeting of the Royal Society of Tasmania, held on the 12th April last. We regret exceedingly that this was not sent in time for our May issue, as besides other matters of much interest, it contains the annual opening address from the presidential chair, on this occasion ably filled by His Excellency Sir John Henry Lefroy, K.C.M.G., F.R.S. The address is full of interest, but it came too late for insertion. As will be seen, the very limited space at our disposal has not been sufficient for the ordinary issue, and we trust our Tasmanian friends will be satisfied that the report would have been inserted if possible. We would urge correspondents generally to endeavor to send their communications so as to reach us not later than the 24th of each month.

THE
SOUTHERN SCIENCE RECORD

MELBOURNE, JULY, 1881.

NOTES ON THE LEPIDOPTERA OF JAPAN.

BY F. C. CHRISTY.

[Read before the Field Naturalists' Club of Victoria 13th June, 1881.]



PART I.

When I arrived in Japan in 1873, entomology had not been pursued to any extent; and as I held a very responsible position under the Japanese Government, requiring all my time, there was very little opportunity to obtain information or specimens; still, when an opportunity offered, specimens were taken, and, having some knowledge of the English Lepidoptera, it soon became apparent that a most interesting field was open, as many species were evidently identical with those of England.

I was introduced to Mr. Pryer, who had also commenced the same pursuit, and from 1873 to 1876 we worked together.

In a new country, unexplored, with insects almost entirely unnamed, it is a difficult task to supply any really positive information; therefore, all that I can attempt in this paper must be general.

Doubtless at the present time the British Museum could furnish an almost complete nomenclature, as duplicates of nearly all the insects taken were being forwarded by Mr. Pryer at the time I left; also during that year 1876 the Japanese Government commenced a museum of natural history, and obtained from me all my specimens and cabinets.

I will commence with the PAPILIONIDÆ, the names of which were obtained by Mr. Pryer from the British Museum. Most of the species are known to me. The list is doubtless very incomplete, as numerous additional species must have been obtained since, and I observe that some have been omitted. Those marked * are identical with the English species.

PAPILIO—(Swallow-tail Butterflies)—

machaon * — Larva feeds upon the fennel and water ranunculus.

japonica — Larva feeds upon the wild orange, &c.

demetrius — " "

alcinus — " "

meneius — " "

sarpedon — Larva hairy, feeds upon a creeping plant.

xuthus — Larva hairy, feeds upon the wild orange.

xuthulinus — " "

pammon — " "

GONIAPTERIX—

rhamni *.

COLIAS—

hyale *. — This insect is very abundant, and identical with the British species.

TERIAS—

laeta.

hecabe.

mandarina.

PIERIS—

rapae *. — Identical with the British species, the larva feeding upon the Brassica.

melete.

napi *.

AUTHOCHARIS—

scolyma.

LEUCOPHASIA—

sinapis *.

PARNASSIUS—

glacialis.

MELITÆA—

Two species.

ARGYNNIS—

laodice.

ella.

ruslana.

fentonii.

sagana.

paphia *.

aglaia *.

adippe *.

Several other species.

LIBYTHEA—

lepita.

VANESSA—

cardui *.

angelica.

glauconia.

io *.

antiopa *. — This insect is found only in the north.

polychloros *. — Larva feeds upon the elm tree.

xanthomelas.

charonia.

PYROMÆTUS—

indica.

culirrhoe. — Closely resembling the red admirable.

LIMENITIS—

sybilla *. — The white admirable of England.

APATURA—

illyia.

EURIPUS—

diagoras.
charonda.

NEPTIS — A beautiful family, graceful in flight, and resembling in habit the white admirable.

arynome.

pryerii.

satyridi. (?)

One other species.

PAMPHILA—

vitrea.

varia.

pelucida.

LETHE—

sicdis.

sicelis.

MYCOLESIS—

gotama.

perdiecas.

NEOPE—

goschkevitschie.

bipuntatus.

YETHIMA—

argus.

HIPPARCHIA—

dryas.

DIPSAS—

taxila.

lute.

saepestriata.

orientalis.

japonica.

AMBLYPODIA—

rama.

japonica.

LYCÆNA—

pryerii.

argiolus *.

japonica.

POLYOMMATUS.

phlæcus *.

THYMELE—

montanus.

Five other species.

GEOPERIA.

Metallic in coloring.



NOTES ON *PTEROSTYLIS VITTATA*.

BY BARON VON MUELLER, K.C.M.G., M.D., F.R.S.

[Read before the Field Naturalists' Club of Victoria 13th June, 1881.]

Through the zeal and circumspectness of Mr. C. Walter, who for many years contributed to my collections of native plants, I have just received excellent fresh specimens of Lindley's *Pterostylis vittata*, a species easily mistaken for *P. longifolia*, and hitherto supposed to be confined to South Western Australia. The plants obtained by Mr. Walter have enabled me to draw a clearer distinction between it and a closely allied congener than from dried material could be given by Bentham in the "Flora Australiensis," and by Lindley in the first writings on this plant. It differs in robuster habit, broader leaves, of which those next to the flowers are hardly reduced in size and never changed to bracts, in the dark reddish not greenish color of the flowers, in the broader and more turgid upper lip of the calyx with thick streaks, in the labellum being smooth on the surface and at the base produced in an erect flat narrow lameolar tooth (not into a roundish tubercle), and finally in the column being provided on both sides towards the base with a semiovate membrane, and towards the summit with a dilated appendage, which terminates downward in an acute narrow long and fringed lobe.

Already in June 1848, when I found a few specimens of *P. vittata* in the valley below the great waterfall of Mount Lofty, near Adelaide, I was surprised to see among the early harbingers of the Spring this Orchid, and made therefore notes as well as on its time of flowering as on the inner structure of the flowers, but no occasion for re-examining the living plant arose to me until Mr. Walter got this species as near to us as the heath ground of Brighton, although I now find a small specimen also in my collection from Wilson's Promontory, gathered there by myself blooming during May, 1853. Near King George's Sound this plant has been obtained in flower as late as July. *P. longifolia* rarely comes into bloom, so far as the southern part of our colony and climatically similar regions are concerned, before August or September, and continues to flower till October, while in the colder regions of southern Tasmania it may be found in bloom as late as December, though in the milder clime of Port Jackson it flowers already from June to September, as recorded in Mr. Fitzgerald's splendid work on Australian Orchids. That *P. vittata* escaped here near us notice for so long a time is due mainly to its early time of flowering, in the same way as *Caladenia fimbriata* was shown only last year for the first time to occur near Port Phillip, when Mr. C. French got specimens of it while engaged in entomological searches, he finding it also as early as May in flower, when the autumnal orchids, such as *Eriochilus*, have passed away, and before the flower-world awakes in a new Spring, although *Pterostylis reflexa* and, perhaps, a few other orchids may show already their flowers equally early in the season.

The labellum of *P. vittata* is as irritable to the touch as that of any other congener, hanging down when quiescent, but shooting up with vehemence should anything foreign come in contact with it, thus closing the orifice of the calyx and perhaps trapping an insect, by which means the process of fertilisation is promoted, the labellum after a short while resuming its dependent position.

PROCEEDINGS OF SOCIETIES.

THE FIELD NATURALISTS' CLUB OF GEELONG.

The first annual meeting of the Geelong Field Naturalists' Club was held on Tuesday, 7th June, in the Free Library, and was well attended by members and a number of ladies and gentlemen. The hall was dotted here and there with tables, on which rested glass cases, containing the various collections made by members, including shells, sea-weed, eggs of all sizes and sorts, geological specimens, stuffed birds, etc., with numerous microscopes and other instruments and appliances to assist those present in minutely inspecting the rare specimens of the mineral, vegetable, and animal kingdoms that arrested the attention on every hand. The meeting partook of the character of a *conversazione*, the reports and addresses being read and delivered at intervals, and the audience in the interim walking and talking, standing around the tables, sitting down, or adjourning to the refreshment chamber adjacent, as their tastes and inclinations led them. Shortly after eight o'clock, Mr. J. Bracebridge Wilson, M.A., President of the Club, took the chair, and inaugurated the proceedings by reading a lengthy and interesting address on the Club, its objects, its progress, and its probable effects socially and morally.

THE PRESIDENT'S ADDRESS.

"LADIES AND GENTLEMEN,—We are met here this evening to hold the First Annual Meeting of the Society called the 'Geelong Field Naturalists' Club.' When we look round this Hall, and see the many objects of interest which, even at this early period in the Club's existence, the members have been able to put before you, I am sure you will unanimously agree with me that our Committee have done wisely in determining that this meeting shall be of an informal character. For although it is my duty, as President of the Club, to address to you a few words on this occasion, when I have for a brief period claimed your kind attention and indulgence, you will be free to examine and discuss at leisure whatever each of you may regard with most interest.

"The object of our Club, you are aware, is to promote and encourage the study of natural history in the neighbourhood of Geelong. It appears to me a good sign, and a matter upon which we may well congratulate ourselves, that societies of this character are being successfully formed in the Australian colonies. It speaks well for our community that, while with many the race for wealth, and with a greater number the struggle for competence, is so absorbing, there should yet be found those who can lay aside the cares of business, and postpone more exciting social pleasures, to cultivate purely intellectual tastes, and exercise their faculty of observation. And so it should be—

"Sure He that made us with such large discourse,
Looking before and after, gave us not
That capability and godlike reason
To fust in us unused."

"Be well assured that no one will perform his or her duty the less faithfully, or be less successful in any worldly pursuit, because, in hours of leisure, the mind has learnt to dwell with delighted wonder upon the beauty and marvel of the material world. I assume, from your presence here to-night, that you are all of that number—that

you have either already studied some branch of natural science or natural history, or that you are desirous to do so, or at least that you take an intelligent interest in the result of such studies. You will therefore, I hope, bear with me while I state briefly my views of the work that this Club should aim to do, and of the manner in which that work should be set about.

"Our Club having been only very recently established, there are probably many members who have not yet much experience of its studies; and I trust I may without presumption address a few remarks in the way of advice to them, while claiming the indulgence of others who are better qualified than myself to perform that task.

"In looking round about us here, and considering the field of operations for our favorite studies, those of us who had similar tastes before coming to Australia cannot but remember, with longing regret, the copses, and lanes, and hedgerows of the old country—"Dear," as a popular writer on natural history says, * 'to all who are capable of appreciating the many beauties of unrestrained Nature, but to the Field Naturalist deriving an additional charm from the varied forms of life which swarm within their precincts—every leaf covered with a very world of minute beings, each bud and flower attracting thousands of happy and sportive existences within the sphere of its potent though invisible perfume, and every plant to creatures innumerable a cradle, a nursery, a banquet, and a home.'

"Not the less will the geologist dwell with wistful recollection on the glorious facilities for the study of the rocks afforded by Great Britain; facilities which a recent writer claims also for New Zealand, the Great Britain of the South, using words which apply equally to either. 'The stratified rocks, he says, from the oldest metamorphic to the newest sedimentary formations, and the eruptive formations from the oldest plutonic rocks to the youngest volcanic lavas, are all represented there.'

"Now first to face our disadvantages; we must acknowledge that the rambles of the Naturalist here are not gladdened, as at home, by varied scenery and woodland beauty; nor rewarded, as in warmer climates, with the teeming wealth of animal and plant life. We must allow that the student cannot here traverse the whole series of rocks with little toil and small expenditure of time and money. Further, it has been remarked, with truth, that here in Geelong there is a lack of leaders. Few have we who can make the paths of science easy for beginners; perhaps none who, on field excursions, can answer with unhesitating knowledge the frequent questions—"What is this?" "What is that?" With these facts before us we must not anticipate that our Club will be rapidly prosperous or continuously and extensively popular. For a few field meetings there will no doubt be some to whom it will afford an agreeable change to collect ferns or mosses *in pleasant companionship*, or shells and sea-weed, or to wander for a while among the rocks and quarries—

"Hammering and clinking, chattering stony names
Of shale and hornblende, rag, and trap, and tuff,
Amygdaloid and trachyte."

"But of these some will soon tire of pleasure so unexciting, others will rest content with a slight and general smattering of natural science, and then will come the test whether this Club is meeting a real want, and doing real work. If not, it will fall into the limbo of abortive and unsuccessful enterprises, and vanish from the scene. Such a consummation, however, need not be feared if the Club is established on the right foundation and worked on the right lines. There would be many reasons greatly to regret such a failure, and not the least because there is no platform on which those of all shades of opinion, religious or political, of all positions on the social ladder,—high and low, rich and poor, workers with head, and workers with hands,—can meet together on such perfectly equal terms as those afforded by a mutual love of natural history.

"As I spoke of certain disadvantages under which the student of natural history in Geelong labours, so let me present to you the companion picture, and assure you that, take up what branch you will, there is enough within your reach to fill up every available moment of leisure in a busy life with subjects of study of the deepest and most fascinating interest. What, let us ask, is our position geologically? We have the plutonic rocks, the granites of the You Yangs, the west bank of Sutherland Creek, and the Dog Rocks near Batesford. We have our basalts of different epochs and various composition. The west shore of our Bay presents cliffs of miocene tertiary as far as the mouth of the Duck Pond Creek, then the upper volcanic beds, which stretch in level plains beyond the Werribee, and far away to the westward, broken by Sutherland's Creek. Under this volcanic formation lie the pleiocene tertiary rocks, which crop out along the cliffs that border the above creek, and the Moorabool to Fyansford, and under this again the miocene. To the east there is the outcrop of tertiary limestone at Limeburner's Point, and beyond that, towards Kensington, the newer pleiocene and overlying basalt for rather over six miles; and then the older pleiocene, overlying the coal sandstone, and extending to Portarlington, St. Leonards, and Queenscliff, broken on the Bel-larine hills by the older volcanic rocks.

"To the south-west, again, there are the mesozoic carbonaceous sandstones of the Barrabools, with patches of overlying miocene, and older pleiocene tertiary deposits. To the south, after crossing the alluvial flats of the Barwon, we come to the lava outflow from the low volcanic hill called Mt. Duneed. This is covered over in most places with a surface deposit of sands, and clays, and gravel drift; and along the coast at and near Spring Creek, and away beyond Jan Juc, the miocene again appears, rich in fossils.

"Along these cliffs in places the lower beds resemble the eocene clays; and two or three miles at sea outside the Heads lumps of the same dark blue clay are dredged up with characteristic shells. The botanist will find abundant material for study within reach of Geelong. Even at this time the grass-tree plains beyond Thompson's Creek are carpeted with the lovely spikes of the *Euphorbia*, rose, ruby, and white, together with the cone-like amber-colored tufts of a dwarf *Banksia*, and here and there the flowery wands of an *Acacia*. Orchids in endless variety abound on these plains in the Spring, and the scrubby up-

lands between Connewarre Lake and Drysdale are rich in flowering plants at the same period of the year. For those who love ferns and mosses there are Fenwick's Gully, and the banks of the Moorabool and the Falls of the Barwon; and, within an easy railway trip, the Falls of Lal Lal. There is no doubt that the fauna and flora of our Bay will richly repay the persevering and careful observer; although not so rich and varied as if the bottom were less covered with mud, and more diversified with rock ridges and reefs. The students of zoology will find a fair prospect of adding to our stores of knowledge; if not in the higher, at any rate in the lower forms of life. To the microscopist I need not say that he will find objects of the highest beauty and interest, go where he will, in rockpools or rivers, waterhole or creek: his only difficulty will be to select a definite line of study from amongst so many temptations.

"The works of Nature are so infinitely various, and so fascinatingly wonderful, when we learn to regard them with the eye of the mind as well as that of the body, that there is great temptation to constant changes of study. Now the only way to do any really good and useful work is to concentrate the attention mainly on one somewhat limited group, until it has been fairly worked out. It is well enough for a while to skim over many subjects, and to read the many charming popular works on every possible branch of natural science and natural history—to learn a little geology, and a little about minerals, a little about beetles and butterflies, and then a little botany; while so doing you will be able to discover in what direction your inclination points. Having determined what branch of natural history you feel most interest in, your next step should be to select a special group for your principal study. If your predilection, for example, be for botany, choose some special division, or alliance, or family; and on this bestow your energies, until you have thoroughly mastered it. The orchids present a favourite group, and I observe that new species have been discovered near Melbourne since the Melbourne Field Naturalists' Club was inaugurated: what, then, may you not hope in this comparatively untrodden field? The plants of our freshwater pools and creeks will present attractions for some, and the fungi offer an opportunity for what might prove most valuable and useful work. I must not longer detain you with this branch of my subject, but will simply point out that what has been said by way of illustration respecting the study of plants will apply equally to all other branches of natural history or science. Do not allow your attention to wander too widely,—concentrate your work.

"And now with regard to the want of leaders. If a genuine love for scientific research exists even in a few, that want will not really militate against the success of our Society. Some of the best work has been done entirely without such help, and by busy men—men eminently successful in business or in professions; in fact it is rare to find a man who has all his time at his command doing any good scientific work. To those who have begun to take an interest in our Society, and who wish to know how to go to work, I say, first determine what particular branch you prefer, and then begin at once collecting specimens with might and main. Preserve them in such a manner that

they shall be always available for comparison and study. And do not mind if at first you cannot find out the names of the objects you collect. Opportunities are sure to occur for learning these by-and-by, and it should be made one of the special objects of this Club to provide such opportunities. We should aim at having within reach of our members correctly classified and named collections of natural objects of every description, and here I will go further and say it should be the aim of this Society not only to furnish such means of instruction to its own members, but it should form by degrees a museum accessible to all. Such an institution is greatly needed in this town, and if suitable space can be provided, and proper supervision arranged for, its value would be speedily recognised.

"In addition to field excursions there should be a meeting on one evening in each week in some commodious and centrally situated room, when all who can spare time should meet for mutual help and joint study, bringing their microscopes, and their recently collected specimens. In this room, or within easy reach of this room, there should be a small well-selected library of reference.

"As there may be many members who do not possess microscopes, it would be well also that a good students' microscope should be placed there for general use.

"And now I have held you too long, and must draw to a close. Let me observe, in conclusion, that our Club deserves success and support on many grounds. Intellectually, the study of natural history expands and helps to train the mental faculties;—socially, it often produces results of great practical use. The study of entomology, for instance, may seem to many a mere frivolous occupation; but it will lead to knowledge which points the way to avert the most terrible insect pests. The student of Mycology may throw new light on the life and development of fungi, which will assist the physician in investigating the causation of disease. Every discoverer of a new genus or species aids in filling in the links in the great chain of Nature, and helps on the time when our systems of classification will become more perfect. Physically, the body is benefited by fresh air and exercise, and the nervous energies recruited by the change from the mill-house round of daily duties.

"Morally, it cannot be otherwise than good that our thoughts should be diverted from cares, which are too apt to be absorbing, to contemplate the beauty and penetrate as far as we may the mystery of what, whether we regard them as the outcome of separate creative acts, or as the long result of forces originally impressed upon the material Universe, are equally, in either light, the wonderful works of God."

The Secretary (Mr. A. Hanson), when the President had concluded his address, read the annual report, which stated that the public had not shown that interest in the Club which its promoters had anticipated, and that the bad weather that generally prevailed had made the majority of the field excursions organised by the members almost failures. The weather was, however, favorable for the journeys made to Buckley's Falls, Moorabool Valley, Eastern Beach Quarries, and the Wauru Ponds quarries. Eight meetings had been held during the year, and

much mutual benefit had accrued from the discussions which took place at them. The want of leaders in different branches of science was felt, and the Committee regretted the loss of Dr. Day (by death), and of the Rev. C. S. Y. Price (by removal from the town). Overtures had been made to the Field Naturalists' Club of Victoria, seeking to be affiliated therewith, as such an union would be highly advantageous. The receipts during the twelve months had been £4 17s 6d, and the expenditure £3 14s 6d, leaving a balance in the hands of the Treasurer (Mr. A. J. Owen) of £1 3s. The outstanding liabilities amounted to £2 2s. The report was adopted, on the motion of Mr. G. F. Link, seconded by Mr. M'Burney. The addresses subsequently given were highly instructive, and were made more pleasant and attractive by being illustrated by numerous microscopical and other experiments. These were as follows:—On "*Phylloxera*," by Mr. W. J. Thomas; on "*Moths and Butterflies*," by Mr. M'Burney; and on "*Flesh-eating Vegetables*," by Mr. G. F. Link. Altogether a reunion of a very social and profitable character marked the close of the first year of the Club's existence.

THE ROYAL SOCIETY OF VICTORIA.

The Royal Society of Victoria held its ordinary meeting on Thursday, 9th June. Mr. E. J. White, Vice-President, occupied the chair.

Mr. G. S. Mauns and Mr. G. R. Steane were duly elected as country members.

Mr. J. R. Y. Goldstein read a paper on some new species of Bryozoa from the Marion Islands, describing five new species of considerable interest as illustrating some of the difficulties interfering with the adoption of recent systems of classification. The species were *Alysidium inornata*, *Bicellaria grandis*, *Malakosaria pholarrhynchus*, *Vincularia steganoporoides*, and *Hornera subdubia*. These were fully illustrated by a series of carefully executed drawings, and at the conclusion of the business of the evening, slides of the species were exhibited under the microscope. Mr. A. M. Henderson read a paper on "A new Scale for the use of Architects and Engineers," describing in detail some novel improvements and adaptations combined so as to produce a scale of more than ordinary utility, while ensuring great economy of time in the preparation of plans. The scale was handed round for inspection and practical illustrations of its use in laying off brick-courses, flooring-joists, steps of stairs, and other work usually involving great labor and loss of time: these were laid down by means of the scale with astonishing rapidity and accuracy. As a labor-saving machine its quality may be estimated from the fact that it is said to effect a saving in time of fifteen minutes in every hour.

Mr. E. J. White then gave a rapid sketch of the methods used in calculating the orbits of comets, illustrated on the blackboard, stating in the course of his remarks that the public were wrong in expecting that professional astronomers should be the first to discover the advent of comets and other unusual occurrences in the heavens: the fact being that the ordinary duties of professional astronomers prevented them from scanning the heavens fully, their attention being almost always

concentrated on the particular spot under observation. At Greenwich, during its many years of work, it was found that unusual occurrences had always passed unnoticed until reported by policemen and watchers generally. As to the report that the comet at present visible is the same that was seen in 1861, Mr. White observed that it would be impossible to say positively until a long series of calculations were made extending over months—perhaps years.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

At a well-attended meeting of this Society, held at the Institute on Tuesday evening, June 7th, the President (His Honor Chief Justice Way) in the chair, an interesting paper was read by Mr. Charles Todd, C.M.G., F.R.A.S., giving particulars in respect to the comet now visible in the heavens to the south-west. He mentioned that the comet was first observed by Mr. Tebbutt, of Windsor, New South Wales, on the night of May 22nd, who gave its position approximately as R.A. 4h. 58m., declination $35\frac{1}{2}^{\circ}$ S. Mr. Ringwood, the Assistant at the Adelaide Observatory, obtained a view of it on the 27th, and on the 29th, 30th, 31st; as also, on June 1st, Mr. Todd himself obtained accurate measurements of its position. The comet is now moving with a slow motion, gradually increasing to the eastward in an orbit nearly perpendicular to the ecliptic. This orbit closely corresponds with that of the comet observed in 1861, and it is therefore by no means improbable that the two are identical. It is, no doubt, true that a period of 419 years was assigned to the comet of 1861, but, as no elliptic data were obtained for the orbit of that comet, it is very probable that in this case a mistake has occurred similar to that which was made with regard to the comet of 1843, whose re-appearance was not expected for 419 years, but which turned up last year. The present comet is very similar in appearance to that of 1861, which was surrounded by a dense mass of nebulous matter passing into a long tail. It was supposed that this tail came into contact with the Earth and produced a remarkable phosphorescence in the air. The question whether the two be actually identical or not will perhaps be decided by the astronomers of the northern hemisphere, as it is probable that the comet will be visible to them within a short time. To us it will be invisible in a few nights, as it will become immersed in daylight. In 1861 the comet was observed to be vibrating with a peculiar movement of oscillation similar to the vibration of a needle under the influence of a magnet, and it was conjectured that this was owing to a polar force having its focus of action in the Sun. Some light may possibly be thrown upon this question by the appearance of the present comet, especially if the two prove to be identical—on which point, however, it is not possible at present to offer more than a conjecture. The paper was listened to with great interest, and an animated discussion took place afterwards.

Dr. W. H. Gaze also read a paper upon South Australian moths, examples of each of which he exhibited.

The meeting then closed.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

An ordinary meeting of the Microscopical Society of Victoria was held on the 30th ult., the Rev. J. J. Halley occupying the chair. It was announced that a special general meeting would be called for the 28th July to consider a proposal to alter the Rules by inserting the word "Vice-President" after the word "President" wherever this word occurs.

The Secretary read a short paper by Mr. Maplestone describing seven new species of *Bryozoa*. These were *Lepralia superba*, *L. vasiiformis*, *L. amphora*, *L. aculata*, *L. perforata*, *L. pulvinata*, and *L. nodosa*.

Mr. Bale read his paper "Contributions to a History of the Hydroid Zoophytes of Australia," which comprised a list of 30 species previously described by various authors, and 28 new species now described and figured. These were divided into 5 *Sertularias*, 5 *Sertularellas*, 1 *Thuiaria*, 1 *Halicornopsis*, 8 *Aglaophenias*, and 8 *Plumularias*. The paper was very interesting, and several members expressed their gratification that the subject had been so ably elucidated.

Dr. Ralph then read extracts from his paper "On the Structure of Blood," describing fully the peculiar changes resulting from the treatment of blood by the application of majenta, copper solution, nitroglycerine, and various acids, viz.,—Prussic, Carbolic, and Hydrochloric acids, also Bromal-hydrate. Considerable discussion followed the reading of this paper, which was considered to be a valuable contribution to science.

THE ROYAL SOCIETY OF NEW SOUTH WALES.

MICROSCOPICAL SECTION.

The ordinary monthly meeting of the microscopical section of this Society took place on Monday, 13th June, at the Society's rooms. Dr. Wright was in the chair. There were present, Dr. Morris, Captain Mann, and Messrs F. B. Kyngdon, H. O. Walker, G. D. Hirst, J. C. U. Colyer, P. R. Pedley, R. Fraser, Dr. Read, and Dr. Ewin. The previous minutes having been confirmed, the Chairman read a paper on the comparative performances of two 1-10-inch objectives by Tolles, and $\frac{1}{8}$ -inch lense by Zeiss. Drs. Wright and Morris exhibited the different performances of the lenses in question on some difficult valves of *Naviculæ* from Watson's Bay, prepared and mounted by Dr. Morris. The striæ on these valves were remarkably faint, and were only one 90,000th of an inch apart. Mr. Colyer read an extract from a letter he had received from Captain Trouton, written on the 7th Feb. last on board the s.s. Poonah, then in the Red Sea, describing a remarkable luminous appearance of the sea in latitude $11^{\circ} 58'$ north, longitude $51^{\circ} 58'$ east, in the Gulf of Aden, and about 100 miles from the Island of Socotro. He thought this beautiful phenomenon was caused by millions of animalculæ resembling a sea-slug of phosphorescent character, which produced in the atmosphere a remarkable soft light without casting a shadow, the appearance being altogether different from anything he had previously seen in tropical seas. Mr. Fraser having exhibited an interesting series of insect preparations, which were viewed under the microscope, the meeting then closed.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club of Victoria was held at the Temperance Hall on Monday evening, 13th June, there being a good attendance. The Rev. J. J. Halley, one of the Vice-Presidents, occupied the Chair.

Mr. W. Patten was added to the roll of members; and Messrs J. Hicks, G. G. Ross, J. D. Scott, Geo. Wharton, — Scott, R. B. Patey, C. F. Wenborn, W. Gordon, jun., F. S. Dobson, and Dr. S. Bernase, were nominated for ballot at next meeting.

Dr. Lucas gave notice of his intention to move the following alterations and additions to the Rules, viz.:—"That the annual conversazione be held on the third Tuesday in April of each year: That the members of the Committee retire annually, but be eligible for re-election: That one Vice-President shall retire each year in rotation, and not be eligible for re-election: That the President shall retire annually, and shall not, after the second year, be eligible for re-election."

Mr. F. C. Christy's paper on the Lepidoptera of Japan was read by Mr. Goldstein; but, in the absence of the writer, the discussion thereon was postponed until next meeting.

Mr. Watts gave an explanation of some fine fossil Polyzoa from the Oligocene beds at Mount Martha, of which he had 55 species, all very carefully prepared for the microscope; also several species of foraminifera, microscopic mollusca, sponge spicules, &c. This exhibit was interesting from the fact of its being the first collection of Eocene Polyzoa shown in the colony, although their existence had long been known to Mr. Goldstein and Mr. Bailey, the latter being the first discoverer.

Mr. Luehmann read a short paper by Baron von Müller on the orchid (*Pterostylis vittata*) recently found at Brighton by Mr. C. Walter, describing its general appearance, and giving an interesting history of the plant.

Amongst the numerous exhibits brought to the meeting may be mentioned some fossil *Cypræ* from Mount Martha, Royal Park, &c., by Mr. J. F. Bailey; two species of *Lepidoptera*, by Mr. F. G. A. Barnard; fossils from Mordialloc, by Mr. J. E. Dixon; 215 species of *Carabidæ*, by Mr. P. Dattari; a fine group of *Goliathus cetoniidæ*, and collection of dried Ferns and Lycopods, by Mr. C. French; and by Mr. D. Best, a few of the Longicorn species of *Curculionidæ* found near Melbourne.

After the usual conversazione the meeting terminated.

A TRIP TO BRIGHTON AND ELSTERNWICK.

BY A FIELD NATURALIST.

Friday, the 1st July, being a partial holiday, a few members of the Field Naturalists' Club resolved to avail themselves of the opportunity to make an "unofficial" excursion to the above neighbourhood. Of those who had promised to be of the company several failed to put in an appearance at the appointed time, but we who did muster had every reason to congratulate ourselves upon having done so, as

the day turned out delightfully fine, and the success met with was, especially considering the season of the year, far in advance of what we had reason to, or indeed did, anticipate.

Arriving at Brighton at about half past 9 a.m., our party were not long in reaching the Red Bluff Hotel, after passing which a careful look-out was kept for the botanical specimens, these being the principal object of the excursion. Our vigilance was soon rewarded by the discovery of a fine patch of the beautiful, and hitherto very rare, orchid *Pterostylis vittata*, the flowers of which are of a dark red color. It was not, until very recently, known that this plant grew about Brighton, a member of the F.N.C. being the first to discover it a few weeks ago, and our eminent botanist Baron von Müller was both surprised and delighted when the specimen was presented to him. Proceeding on our way, many of another but much more common orchid, *P. concinna*, flowers of a greenish white, were met with. We should be glad to see this class of plants become more popular, as the flowers are really very pretty, many of them being most varied in their colors, and often assuming exceedingly curious forms. In all directions might be seen the common white heath, *Epacris impressa*, the growth of which is, however, considerably impaired by the too frequent attacks of the numerous cattle browsing about, its height, in consequence, being limited to somewhere about 12 to 18 inches. *Corræa speciosa*, a dark green shrub, having long greenish-yellow flowers, was occasionally seen, as was also *Billardiera scandens*, a small dark-leaved and scarce shrub, with small yellow flowers. Of *Hibbertias* two species were met with, viz., *H. diffusa*, and *H. stricta*, both showing well with their yellow flowers, the former being much the better of the two. The lovers of the fruit of the *Astroloma humifusa*, or native cranberry, will in a week or two hence be enabled to indulge their propensity for this luxury, as numbers of berries were seen approaching their edible period. This plant is of the creeper species, never growing higher than about an inch, and having brilliant scarlet flowers of about half an inch in length. *Daviesia ulicina*, a shrub having dark red flowers was well out, as were also two species of *Leucopogon*, viz., *L. virgatum* and *L. reichei*, both having small white flowers. Of *Acacias* the only species met with in flower was *A. suaveolens*. This species grows small, averaging six to eight feet, having long narrow leaves, and the flowers being of a light yellow color, and very highly scented. If flowering in summer, instead of the middle of winter, this tree would probably be a favorite resort for butterflies, beetles, &c.; but, as it was, not a living thing was found on it. *Leptospermum laevigatum*, or coast ti-tree, whose leaves are of an oval shape, half an inch in length, having a simple white flower, was rather plentiful, as was also a pretty little white flower with yellow centre, *Brachycome grammifolia*, the plant of which grows to the height of about two to three inches. Growing on the cliff side facing the sea, the native *Clematis*, *C. microphylla*, abounded; and those who are desirous of seeing this creeper in its beauty should take advantage of the present season to do so, as it is now covered with its simple but pretty little white flowers. *Banksia Australis*—or, as it is very commonly called, honeysuckle tree,—was fairly well out with its yellowish bottle-brush flowers; and it was in the wood of this tree that the only entomological specimens

were met with: it is now pretty well-known to entomological collectors as being the resort of the beautiful Longicorn beetle *Uracarthus triangularis*, whose larvæ breed in it; and many of these were secured, as also, to the surprise of the searchers, several perfect insects, which, in the ordinary course of events, would not be expected to make their exit for at least a couple of months to come.

The plants we have enumerated are indeed but a very small percentage of those covering the whole of this delightful locality, than which we know of none offering a more interesting field to the natural history collector.

At a place called Rickett's Point, diligent search was made for fossil sharks' teeth, which are known to be obtainable there, and we were rewarded with four specimens, one of which was a remarkably fine one, being considerably over two inches in length. Why these fossils should only be found at this one particular spot is a mystery we leave to be explained by those better acquainted with the subject than, unfortunately, were any of those present.

On our way back to the Railway Station a member of the Club was met with who had been on ornithological sport intent, but he had evidently fared very badly, as his bag showed but one unfortunate specimen, that of a species of honey-eater. The 6.50 train was duly caught, and the one hope experienced by the whole of our party before separating was that we might shortly be enabled to arrange for another trip, and, if possible, with a larger number of members.

Correspondence.

LISTS OF SPECIES.

To the Editor of the SOUTHERN SCIENCE RECORD.

SIR,—The student of natural history in this colony has very up-hill work in obtaining knowledge of what has been done sufficient to enable him to do good work. It is this that prevents many from pursuing the study of natural history. The only general sources of information are from books upon the natural history of other countries; which, while being all that a student in such countries could desire, are not of very much use here. In England the student can get books, some of them very cheap, which will give him all information requisite; but information on the fauna of this colony cannot be obtained except at an enormous cost, and it would require a considerable library to hold all the books in which our species are described. The Melbourne resident has the advantage of the Public Library and Museum, but even then he cannot always find what he wants. I propose that you should publish lists of species known to exist here. I would suggest that you obtain, from those capable of giving the information, lists of the genera and species of whatever branch they may be working at; these lists would not be perfect, because some others may have additional species; and in a new country like this new ones are always being found; but they will be very useful as a record of our species as far as known, and be available to most people. I think the SOUTHERN SCIENCE RECORD should aim at being a record of our natural history, and these lists will be a very good commencement of such record. I would suggest that the first lists be published anonymously (the Editor satisfying himself that he has obtained them from reliable persons), because many might be prevented from supplying such lists from the fear that they would be rushed for specimens. No one, I presume, would be unwilling to exchange specimens. Supplementary lists should bear the names of the senders and the habitat. These lists of simply the names, genera, and species, with perhaps the authority for the specific name and habitat, but with no descriptions, would not take up much room in the



SOUTHERN SCIENCE RECORD; they could be set up in two columns on a page, and a page would hold about 100; and if two or three pages could be filled every month it would not take very long to enumerate a vast number of species and give a vast amount of information which people want, and it would also bring to light an immense amount of information at present lying hidden: it would be a great incentive to research, to discover that one has perhaps only a fraction of the number of species known to exist; it would be a matter of congratulation to any one to find he can add to the list, and it would be a matter of general approbation to see our fauna catalogued in an accessible form. Specialists may think these lists unnecessary, because they may have the means of knowing what has been done in their branches, but it is to those students who are beginning that they will be of the greatest use, and it may induce them to confine their attention to some particular branch instead of flitting from one subject to another, very often in disgust at not being able to get the very information I propose should be given them.

Trusting the scheme I suggest will be found feasible,

I am, &c., &c.,

A COUNTRY MEMBER OF THE FIELD NATURALISTS' CLUB.

[We will be quite willing to insert reliable lists such as those proposed. The subject has long been before us, but we had reserved this, with several other improvements, for the time when increased support and contribution of papers would necessitate the enlargement of our space.—Ed.]

NOTES, MEMORANDA, &c.

We have just received a copy of the "Journal and Proceedings of the Royal Society of New South Wales for 1880, vol. xiv. It contains nearly 400 pages, mostly original contributions to Astronomical and Meteorological Science. The narrow limits of our space preclude our giving an extended notice of these, much as we desire to do so; for the articles generally display an amount of careful observation on the part of the writers such as should command the attention of all who are interested. Without any desire to interfere with the bent of the members generally, we yet feel that the Science of Biology might well receive a little more attention than it does in this Society. There are many good names in the list of members from whom valuable papers might be expected; and we would urge the Council to make special endeavours to draw these gentlemen out of their partial seclusion. The many strange forms of animal and vegetal life known to exist in the extensive territory of New South Wales would seem to offer special inducements for continuous observation. In addition to the ordinary meetings, the Society holds meetings of its sections, of which there are eight. Section E, Microscopical Science, met regularly during the session, and did good work.

Subscribers who fail to receive their copies regularly are requested to communicate at once to the publisher. Every care is taken to avoid errors of delivery; still mistakes will occur, which we will be only too well pleased to remedy.

THE SOUTHERN SCIENCE RECORD.

MELBOURNE, AUGUST, 1881.

THE PALLIOBRANCHS OF THE VICTORIAN TERTIARIES.

By R. TATE.

Having some few years previously familiarised myself with the rocks and fossils of the older tertiaries about Hamilton, I gladly availed myself of the opportunity afforded by a visit to Melbourne in the early part of this year to extend my observations to the fossiliferous sections of the tertiaries near the metropolis.

It is not my present intention to discuss the question of the correlation of the principal sections of the older tertiaries in Victoria, South Australia, and Tasmania, though you may gather from a paragraph in the last number of this journal, p. 109, that I am occupying myself with that subject; suffice it to say, that in my opinion, the key to the correct reading of the sequence of the Australian Tertiary deposits is afforded by some of the South Australian sections, and that in all former attempts in this direction authors have not paid due regard to the probable fact that differences in the fossil assemblages at different localities may have arisen from peculiar petrographic constitution.

Having lately occupied myself in the study of the Palliobranchs of the Australian Tertiaries (*vide* Trans. Roy. Soc. S. Australia, vol. III, 1880, pp. 140-170, 5 plates), I was especially desirous of adding to the Victorian list of species of that class, and now offer the following amended catalogue:—

SPECIES.

VICTORIAN LOCALITIES.

<i>Waldheimia Garibaldiana</i> —Davidson. ...	Muddy Creek*, Corio Bay*, Schnapper Pnt. (McCoy).
<i>Waldheimia Tateana</i> —Woods.	Muddy Creek.*
<i>Waldheimia Corioensis</i> —McCoy.	Corio Bay*, Jan-Juc, and Muddy Creek (McCoy)
<i>Waldhemia insolita</i> —Tate.	Corio Bay.*
<i>Terebratulina Scouleri</i> —Tate.	Muddy Creek*, Schnapper Point*, Corio Bay.*
<i>Terebratulina Davidsoni</i> —Etheridge, <i>fls.</i>	Muddy Creek.*
<i>Terebratulina lenticularis</i> —Tate.	Corio Bay.*
<i>Magasella compta</i> —Sowerby.	Port Fairy (Strzelecki); Portland (Woods).
<i>Magasella Woodsiana</i> —Tate.	Muddy Creek.*
<i>Thecidium australe</i> —Tate.	Muddy Creek.*
<i>Rhynchonella squamosa</i> —Hutton	Muddy Creek* and elsewhere (McCoy).

[The sign * affixed to localities indicates that examples of the species, to which the localities refer, have been collected by me *in situ*.]

Touching the prior claim of the specific cognomen *Garibaldiana*, as applied to one of the Victorian fossils related to the recent *Waldheimia Australis*, I have given, in my monograph, op. cit., p. 147, the history of the application of that and other names to the species. Professor McCoy has stated that the type of *W. Garibaldiana* came from Italy, and employs the name *macropora*, and at the same time does an injustice to that able pioneer of Australian Tertiary Palæontology—the Rev. J. E. Tenison-Woods, who had described it so far back as 1865. But to remove any doubt that may linger in the minds of those swayed by the opinion, published in the *Pal. Decades* of Victoria, as to the specific identity of *W. Garibaldiana* and *W. macropora*, I quote from a letter written by Mr. Davidson to me, bearing date 12th April, 1881.—“I was glad to see my *W. Garibaldiana* among them (alluding to a collection of Australian Tertiary Palæobranchs which I lately forwarded). I should never have given it that name if I had known it was Australian: when Etheridge gave it to me he assured me that a lady had got it in Sicily, and as at that time (1862) Garibaldi was the great man I named it after him. It seems to be a variable species.” I may add that the specimens, which served for the illustrations of *W. macropora* in the *Pal. Decades*, are not in a condition for critical comparison—being more or less crushed and shell-less. Some better specimens, which I collected at Corio Bay, leave no room to doubt the identity of *W. macropora* with *W. Garibaldiana*, which occurs in such profusion and fine state of preservation in the middle beds of the R. Murray cliffs.

PROCEEDINGS OF SOCIETIES

THE ROYAL SOCIETY OF NEW SOUTH WALES.

ASTRONOMICAL SECTION.

The monthly meeting of the astronomical section of the Royal Society of New South Wales was held on the 1st July, at the Society's House, Elizabeth street, Mr. H. C. Russell, Government Astronomer, occupying the chair, and the attendance being fairly large. Mr. J. Tebbutt, F.R.A.S., read an interesting paper “On the variable star R Carinæ, on the star Lacaille 2145:” and Mr. T. Brinders gave one “On the conjunction of Venus and Saturn.” An interesting discussion arose, and the meeting terminated.

ORDINARY MEETING OF THE SOCIETY.

A general monthly meeting of the Royal Society of New South Wales was held on 6th July, at the Society's Rooms, Elizabeth-street, Mr. H. C. Russell, Government Astronomer, in the chair.

Several new members were introduced, after which a ballot took place, resulting in the admission to membership of the following gentlemen:—Dr. J. T. Newton, Messrs Leopold, H. Delarue, Karl W. Georgs, Lorimer E. Marcus, G. H. Knibbs, Edward H. Rennie, M.A., B.Sc., John Smedley, John Souttar, and W. H. Wesley. Two technical papers—one being preliminary notes on *Smilax glycyphylla*,



by C. R. A. Wright, D.Sc., and E. H. Rennie, M.A., B. Sc.; and the other on "New Zealand Kauri Gum," by E. H. Rennie, were taken as read. The Rev. Peter Macpherson, M.A., read a paper entitled "Astronomy of the Australian Aborigines;" and the Chairman read a paper on "The spectrum and appearance of the recent comet." The papers elicited a considerable amount of conversation, and the authors received unanimous votes of thanks for their interesting and valuable contributions. The following donations have been received by the Society since its last meeting:—From the North of England Institute of Mining and Mechanical Engineers: Transactions, vols. 26, 27, 28, and 29; Illustrations of Fossil Plants and three other works. From Editorial Committee of the Norwegian North Atlantic Expedition 1876-1878: Zoology, 1 vol., on fishes, by Robert Collett; Chemistry, 1 vol. by Hercules Torne. From the Literary and Philosophical Society of Manchester: Proceedings, vols. 16, 17, 18, and 19; Memoirs, vol. 6. From the Naturhistorischer verein der preussischen Rheinlande und Westphalens in Bonn: Verhandlungen, 4 vols, 1878-1880. 5 volumes and pamphlets from the United States, 11 volumes and pamphlets from the United kingdom, 27 volumes and pamphlets from the Continent, 20 volumes and pamphlets, Intercolonial. From Professor Liversidge: Congress International de Geologie, vol. 21. Total donations, 93.

THE ROYAL SOCIETY OF VICTORIA.

The Royal Society of Victoria held an ordinary meeting on the 14th July. The President, Mr. R. L. J. Ellery, F.R.S., occupied the chair.

Mr. J. S. Götz was duly elected a member, and Mr. F. A. Kernot was elected an Associate.

Mr. Ellery then read his paper detailing the result of "Some Trials with Hagemann's Vacuum Anemometer." This is an instrument constructed on the principle that a current of air passing over the open end of a glass tube having the other end immersed in fluids would produce a vacuum in the tube corresponding to the force applied. The fluid would then rise in the tube, and the extent of its rising and falling could be read off on a suitable scale, and so indicate the actual force of the wind at the time of observation. Hagemann's instrument, which might be properly styled an Anemograph, was made self-recording, so that the varying intensity of the wind, from the faintest zephyr to the severest gale, was faithfully depicted on a revolving cylinder covered with smoked paper. The instrument had been under trial at the Observatory for some time, and had so far proved to be the most reliable anemometer known.

Mr. W. C. Kernot, M.A., then narrated some recent discoveries in electrical science, and described M. Camille Faure's improved form of secondary cell, which was capable of storing up electricity so that it could be used at any time by being simply drawn off as required, one of these cells, closed in a square box, weighing in all about 200lbs, would store up electrical energy equal to one horse-power exerted for one hour. Ten such boxes weighing 1 ton would contain sufficient power to drive a tram car weighing 5 tons, with 4 tons of passengers,

for 50 miles at the rate of 12 miles per hour. One of these boxes could easily be stowed away in a boat 25ft. long, carrying 20 passengers, which could be propelled from Prince's Bridge to Hawthorn and back, getting rid of all unpleasantness connected with the use of steam, and at a much lower cost. These boxes could be charged in a few minutes at some central depot.

Mr. Ellery laid on the table a very useful Planisphere of the southern sky prepared at the Observatory, and shortly to be published. This ought to be in great demand by all who are in any way interested in astronomy, supplying as it does a ready means of ascertaining the position of any of the heavenly bodies at any particular time. A very useful invention was also submitted to the inspection of members, consisting of two cardboard lampshades on which were lithographed maps of the heavens: the positions of the stars are accurately given, and are perforated so as to allow the light of the lamp to shine through, thus giving a miniature representation of the actual appearance of the sky on a starry night.

THE ROYAL SOCIETY OF SOUTH AUSTRALIA.

The usual monthly meeting of this Society was held at the Institute on Tuesday evening, July 5th. There were about twenty persons present, and His Honor the Chief Justice (President) occupied the chair.

The Secretary announced the receipt of several donations to the library, amongst them being a number of very valuable works.

Mr. E. Meyrick, B.A., of Sydney, was elected a Fellow of the Society.

Mr. F. G. Waterhouse, on behalf of the Governors of the South Australian Institute, exhibited a number of specimens of malachite from the Burra Burra Mine, and portion of a very large collection of copper ores lately presented to the South Australian Museum by Sir Henry Ayers.

The Secretary read a report from the Hydraulic Engineer's Department of the results of boring near Port Augusta. It was stated that a depth of 407 feet below the surface had been reached.

Professor Tate made some remarks about a polyzoal limestone rock found in a well at Mitcham. He said it left no doubt that beds of the Miocene period were preserved in this locality beneath the Pliocene drift. He also referred to a fine crystal of rutile in granite obtained from near Encounter Bay and exhibited by Mr. T. D. Smeaton.

GEOLOGY OF THE NEIGHBOURHOOD OF PORT WAKEFIELD.

Professor R. Tate read a paper on this subject. It was supplementary to one communicated by Mr. Rutt on "The Port Wakefield Bore," and consisted of a summary of the strata pierced in the boring, and of a description of a horizontal section from the Hummocks Range across the Port Wakefield Plain.

NOTES ON THE NATURAL HISTORY ABOUT FRANKLIN HARBOUR.

The following is an abstract of a paper read by Professor Tate. "The general geological features comprise:—Sand-dunes and pleis-

tocene sandrock with travertine cover on the seaboard, which protect extensive tracts of recent marine deposits, largely occupied by mangrove swamps. Pliocene drift extends from the coast to about five miles inland, changing from a sandy loam at low levels to clayey and stony near the hills. Pre-silurian metamorphic rocks constitute the hill region. The trend of the hills is conformable with that of the coast-line, and with the prevailing line of strike. The direction of the dip is easterly, and the beds repose at high angles, and not unfrequently exhibit much contortion. The prevailing rock is mica slate, with intercalations of hornblende, schist, gneiss, quartose felsites, quartzites, and small bands of crystalline limestone and felstones; the whole reticulated by veins of a granitoid rock, consisting of quartz, albite, and black hornblende in prisms. Garnets and galena were collected from the granite veins; and magnesite in thick veins was observed in talcose slate in the Oolabidnie Creek. There are no perennial streams in the hills, though the deep and broad watercourses excavated in the pliocene drift would suffice for rivers of large volume.

The floral features, chiefly in relation to their dependence on the geology, were as follows:—1. The recent marine deposits are characterized by *Avicennia officinalis* (the mangrove) and *Salicornia arbuscula* (shrubby samphire). 2. The pliocene drift, where it is sandy loam, is covered with mallee scrub, with undershrubs of *Aster*, *Erisotemon*, &c. Nearer the hills the mallee is less frequent, and gives place to *Myoporum deserti* (sandalwood) and *Acacia homolophylla*, with brushwood of *Beyeria opaca*, *Dodonæa viscosa*, *D. stenozyga*, *Aster conocephalus*, *A. decurrens*, *Rhagodia parabolica*, *Alyxia buxifolia*, *Eremophila Brownii*, &c. *Callitris verrucosa* appears where the soil is a sand, and the more open parts are occupied with tussocks of *Xerotes effusa*, and of species of *Cladium* and *Lepidosperma*. 3. The prevailing vegetation of the hill region is much diversified in relation to the rock structure. In the gullies and on the slopes of the mica slate tracts gums flourish, and *Bursaria spinosa* constitutes the undergrowth, and the whole surface is clothed with short herbage. The chief herbaceous vegetation noted consisted of *Hibiscus Wrayæ*, *Drosera Menziesi*, *Lagenophora Huegelii*, *Wurmbea dioica*, *Hypoxis pusilla*, *Ophioglossum vulgatum*, *Cheilanthes tenuifolia*, &c. On the quartzites *Casuarinas* prevailed; whilst the sharp detritus of the felstones and granites was chiefly occupied with a brush of *Melaleuca uncinata*, here and there interspersed with the low shrubs of *Acacia spinescens*, *Styphelia sonderi*, and *S. humifusa*, and tussocks of *Triodia pungens* (porcupine grass). Here was gathered *Schoenus Tepperi*, hitherto known only from Ardrossan, where it has the same habitat—rocky, dry hillsides and summits, chiefly in the neighbourhood of granite. Of the land mollusca, *Helix Flindersi* and *Bulinus Adelaide* are confined to the pliocene country; whereas *Nanina rustica* and *Helix patruelis* occurred, though abundantly, only over the pre-silurian country. *Succinea Australis* is common to the two regions. In the artificial dams at Yadmana and Wangaraleednie an undescribed species of *Aplexa* was collected: the name of *rubida* is proposed for it, because of the carmine or ruby colour of the external parts of the

animal. A small species of *Bythinella* lives in the waters of a small spring near Wangaraleednie.

The paper was listened to with great interest, and the Professor subsequently answered several questions which had been suggested by it.

The meeting then closed.

THE ROYAL SOCIETY OF TASMANIA.

The usual monthly meeting of the Society was held on Tuesday, the 14th June, Mr. T. Stephens, Vice-President, in the chair.

The following gentlemen, who had previously been nominated by the Council, were balloted for, and declared duly elected as Fellows of the Society, viz., Messrs Cecil J. Parsons, Frederick Mace, and Charles C. Nairn.

The Secretary brought under notice the following returns for the month of May, viz:—

1. Number of Visitors to Museum—On Sundays, 476; on week days, 610; total, 1,086.
2. Ditto to Gardens, total 4,029.
3. Plants and Seeds received at Gardens:—From Mr. C. F. Creswell, Melbourne, Palm seeds from Lord Howe's Island, and 50 plants. From Mr. J. Sangwell, Melbourne, 48 Ferns. From Mr. Wm. Bull, London, 30 packets seeds. From Mr. J. T. Duthie, Superintendent Botanic Gardens, Saharaupur, N.W. Province, India, seven varieties of seeds of Coniferae. From Mr. J. Latham, Liverpool-street, 30 packets imported seeds. From Baron Ferdinand von Mueller, 3 packets seeds.
4. Plants, etc., sent from Gardens:—To Messrs Shepherd and Co., Sydney, 1 box Bulbs, various. To Mr. C. F. Creswell, Melbourne, 1 ditto ditto. To the Horticultural Gardens, Melbourne, 1 ditto. To Melbourne Botanic Gardens, 1 case of plants and Sphagnum Moss. To Lieut. James, H.I.J.M. ship Riujio, 25 packets seeds. To Captain Fukushima, of the same ship, 50 ditto ditto.
5. Tench supplied:—To the Acclimatisation Society, Geelong, 132 fish.

Meteorological Returns.

1. From the Marine Board:—Tables from Mount Nelson and South Bruny for May.
2. From Mr. D. C. Purdy:—Tables from Macquarie Harbour for March and April.

Time of leafing, flowering, and fruiting of a few Standard Plants in the Botanic Gardens during May, 1881:—

- 10th. Medlars commencing to ripen.
- 21st. *Photinia serrulata*, commencing to flower.
- 23rd. *Diosma alba*, ditto.
- 28th. *Ailanthus* leaves all shed.
- 30th. *Spiraea prunifolia plæna*, commencing to flower.



The presentations to the Museum were as follow :—

1. From Mr. H. A. Ward, Rochester, New York :—Skin of fox prepared for mounting. Cast of Upper Silurian Fossil (*Homalonotus delphinocephalus*).
2. From the Exhibition Commissioners :—Specimens of Minerals, Models of Fruit, etc.
3. From His Excellency Sir J. H. Lefroy, C.B., K.C.M.G., etc. :—A framed portrait of Captain Cook.

The Chairman exhibited some specimens of the rocks of Port Cygnet, together with rolled pebbles from the drift of the Huon Valley, which had been forwarded to the Museum ; and remarked that the latter were representatives of rocks not now found *in situ* within the settled districts of the south, and that with reference to the question of the auriferous capabilities of Port Cygnet there was not yet much that could be added to the information already communicated to the Society.

The Hon. Secretary read a paper contributed by Professor R. Tate, Assoc. Linn. Soc., F.G.S., "On Type Species of Tasmanian Shells, unrecorded in the 'Census of Tasmanian Shells.'"

The Chairman read, "Notes on a species of *Zieria* (*Z. veronica*)," by Augustus Simson, F.L.S., with its identification by Baron von Müller.

Mr. E. J. Crouch, F.R.C.S., Eng., read a paper on "The Queen's Domain, with suggestions for its improvement."

The meeting closed with the usual vote of thanks to the authors of the various papers, and the donors of presentations to the Museum.

The monthly evening meeting of the Society was held on Tuesday, the 12th July ; His Excellency, the President, in the chair.

Mr. W. F. Petterd, of Launceston, who had previously been nominated by the Council, was balloted for, and declared duly elected as a Fellow of the Society.

The hon. secretary, Mr. Barnard, brought forward the following returns for June :—

1. Number of visitors to Museum :—On Sundays, 374 ; on week days, 843 ; total, 1,217.
2. Do. to Gardens, 3,495.

Meteorological Returns :—

1. From the Marine Board, tables from Kent's Group Light-house for February, March, April, and May ; Cape Wickham, do. ; Goose Island, do. for April and May ; Swan Island, do. for May ; Bruny Island, do. for June ; and Mount Nelson, do. do.
2. From Mr. D. C. Purdey, Macquarie Harbour, table for May.

Time of leafing, flowering, and fruiting of a few standard plants in the Botanic Gardens during June, 1881 :—

- 17th. *Maclaura aurantiaca*, commencing to shed leaves.
- 20th. Common Privet, ditto.

25th. *Iris alata*, commencing to flower.

28th. *Dalycanthus præcox*, in flower.

30th. Black Mulberry, leaves all shed.

The presentations to the Museum were as follows:—

1. From Captain Capp, barque Italy, Stalactites and Crystals of Carbonate of Lime, from a cavern at Hamelin Bay, West Australia.
2. From Master B. Watchorn, Specimens of Tin Ore, etc., from Mounts Bischoff and Heemskirk.
3. From Mr. E. D. Swan, a Black Magpie (*Strepera arguta*), mounted.
4. From Mr. W. Murray, Glenorchy, a Brown Trout (*Salmo fario*), caught in the O'Brien's Bridge Rivulet.
5. From Mr. A. J. Taylor, east of face of Lord Brougham.
6. From the Tasmanian Commissioners, Melbourne Exhibition, 1880-1, a fine series of mineralogical specimens of great value.

Library. From Mr. J. Barnard. Two copies of Baron von Müeller's work, entitled "Select Extra-Tropical Plants, suitable for Industrial Culture," for the Library, and for the use of the Superintendent of the Botanic Gardens.

Mr. Stephens exhibited specimens of a paper-like material used in stereotyping at the office of the *Launceston Examiner*, and one from the establishment of the Hobart *Mercury*. This soft and flexible material has almost universally superseded the use of plaster moulds in stereotyping, and the sharpness of the type cast from it, when properly prepared, is quite remarkable.

Mr. Nowell presented some tables which he had compiled with the assistance of Mr. Langworthy, showing the mean of the observations for the five years, 1871-5, taken at the lighthouses and other coast stations in Tasmania, and published by the Society; and read some remarks upon the subject, with special reference to the winds in Bass' Straits, and the climate of the West and North West Coasts.

The Chairman remarked that he entirely agreed with the author as to the importance of multiplying registers of the rainfall, the simplest and easiest of all observations, and one which becomes very interesting for comparing different seasons. Probably the amount of rainfall has more to do with the agricultural or pastoral value of different districts than temperature or anything else; and he had on a previous occasion advocated the employment of the masters of common schools, many of whom would no doubt be very willing to take charge of a rain-gauge, and perhaps of other instruments.

Captain Stanley remarked that he thought there must be something wrong with the figures relating to the pressure of the wind. He believed that those adopted at the lighthouses were guessed by the observers, and not arrived at by the aid of anemometers. It was not the custom in the colonies to use Beaufort's scale. That in use was one common to all the Australian colonies, and consisted in supposing that the wind ranged in force from 0 to 6, the figure 6 representing hurricane force. Beaufort's scale, or that in common use in the Royal Navy, supposed the force of the wind to be represented by figures, ranging from 0 to 12—0 representing a calm, and 12 a hurricane.

Mr. Justice Dobson thought it undesirable to publish any meteorological observations with the imprint of the Royal Society unless we were satisfied as to their accuracy. That Mr. Nowell's paper cast a doubt upon the accuracy of the instruments used. That these might be tested, when the lighthouses were visited, by procuring a duly regulated barometer and thermometer of the Kew Standard, and by taking these instruments round and comparing with them those used at the lighthouses, the accuracy or errors of which would then be ascertained.

The Chairman remarked that he agreed very much with Mr. Justice Dobson that it was not desirable to publish the observations taken at the lighthouses. The great value of these observations was to enable meteorologists to know the course of great atmospheric disturbances; to give information to the Board of Trade and Marine Courts of Enquiry, and to meet exceptional occurrences; but they are not, and cannot be, made sufficiently complete and accurate to have scientific value; nor are the observers, however intelligent and willing, sufficiently instructed. There is great danger of adding to the masses of unreliable figures already before the world, which it is almost impossible to discriminate from the good data. At the same time, he thought the Society under an obligation to Mr. Nowell for taking the trouble to examine and adjust these returns, and hoped his remarks would not be taken as depreciating that gentleman's labours: he could only deal with the figures furnished him.

Mr. Nowell was quite willing, as there appeared to be doubts as to the accuracy of the observations themselves, or of the instruments with which they were made, that the paper should not be published. His object would have been to some extent attained by directing attention to the subject, and by eliciting the information with which they had been favoured by the members who were present. Since he had come into that room he had casually taken up a publication, emanating from the Sydney Observatory, containing a large number of meteorological observations extending over several pages; and on looking at the prefatory matter, he found that the work was done by the astronomer, with the aid of amateurs whose assistance he had solicited; and the speaker suggested that something of the same kind might be done here. Meteorological observations had been taken at New Norfolk for a series of years by Mr. W. E. Shoobridge, but they had not been reduced. Work of this kind might, he thought, easily be done by organised co-operation among a few volunteers. He hoped that the discussion which had taken place would be the means of obtaining further information as to the climate of the West and North-West Coasts, a part of the Colony which at the present time was exciting so much interest.

The proceedings closed with a vote of thanks to Mr. Nowell for his paper, and to the donors of presentations—special reference being made to the large number of specimens contributed by the Tasmanian Commissioners for the Melbourne Exhibition

THE LINNEAN SOCIETY OF NEW SOUTH WALES.

The monthly meeting of the society was held at the rooms, Free Public Library, on Thursday evening, the president, Mr. J. C. Cox, F.L.S., M.D., in the chair. Mr. P. A. O'Shanesy, of Emerald Station Rockhampton, and Mr. H. A. Whittell, of the Survey Department, were elected members. The following donations were acknowledged:—Report of the Botanic Gardens, Adelaide; Archives Neerlandaises Societe des Sciences, Haarlem; Report of the Zoological Station, Naples; Report of the Vienna Society of Zoology and Botany; Verhandlungen des Naturhistorischen Verines der preussischen Rheinlande und Westfalens, Bonn, 1879-70: Annales de la Societe Malacologique de Belgique, 1876-77-79. Papers were read by the following gentlemen:—1. By the Hon. W. Macleay, F.L.S., on behalf of the Rev. Dr. Woolls—continuation of paper, "On the Plants of New South Wales." 2. By Mr. J. Brazier, C.M.Z.S., &c., "On a new *Bulimus* from New Caledonia, to be called *B. Rossiteri*." This new and interesting species is quite distinct from any other found in New Caledonia, and was found at a native village by Mr. Rossiter. 3. By Dr. J. C. Cox, F.L.S., "On Nomenclature and Distribution of the Genus *Pythia*." 4. By Baron N. de Miklouho-Maclay, "Remarks on the Circumvolutions of the Cerebrum of *Canis dingo*," from which it appears that the dissection of the brain of our native dog shows that although it does not differ very greatly from brains of other breeds of dogs, it is very fully developed, and indicates considerable sagacity. *Canis dingo* having to procure its own food, its brain has probably attained its development by constant exercise. The fifth paper, also by Baron Miklouho-Maclay, "Reports on Ovariectomy, by the Natives on the Herbert River," opened up a fresh page in our knowledge of aboriginal customs, and elicited considerable interest. Dr. Cox, Mr. Ramsay, and Mr. Gilliat had heard that the operation was at times performed among different tribes of blacks, Mr. Ramsay mentioning a case reported to him in which the subject was a dumb girl at York Peninsula; it was said to be practised there on females suffering from any infirmity to prevent its perpetuation. Mr. Macleay said the blacks were a much more clever and intelligent race than they usually have credit for being; that they are governed by very exact laws, of which we know very little. Mr. Gilliat said that one informant had told him that he had seen some very fat women on the Herbert and Mulligan Rivers, whom he was informed had had the operation referred to performed on them.

Exhibits: Baron M. Maclay—Photographs and drawings of the brains of *Canis dingo*. Mr. Ramsay—new species of snake-like lizard, *Pygopus*, from Nichol Bay. Mr. Brazier—*Bulimus Rossiteri*, described in his paper. Mr. Pedley—Embryo of *Hippocampus*, or sea-horse, taken from the pouch of the male. Mr. Gilliat—Hinck's "British Marine Polyzoa," 2 vols., just published. Dr. Cox—the fine series of *Pythias*, illustrating his paper. Mr. Palmer—Skull of a native of Broadsound, Queensland, upon which Baron Maclay made a few remarks comparing the aboriginal and European types.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held a special general meeting on Thursday, 23th July, for the purpose of altering the rules so as to provide for the election of a Vice-President. The rules were altered accordingly, and the meeting adjourned to re-assemble immediately after for the ordinary monthly meeting.

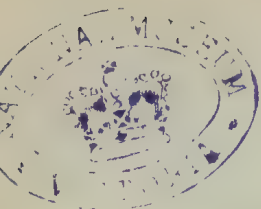
The Rev. J. J. Halley was unanimously elected Vice-President of the Society, and hearty good wishes were accorded that he might enjoy this projected trip to England.

The rest of the evening was devoted to the examination of specimens, several fine instruments being also shown by the members.

COMPLIMENTARY SOIREE TO THE REV. J. J. HALLEY.

The members of the Field Naturalists' Club of Victoria met at the Coffee Palace, Collins Street, on Friday evening, the 29th of July, to bid farewell to the Rev. J. J. Halley, one of the vice-presidents of the Club, who was about departing for England in order to represent the Congregational Church of Victoria at the forthcoming conference to be held at Manchester. Baron von Müller occupied the chair, and gave an interesting address on the study of natural science, alluding especially to the brilliant discoveries of the illustrious Edmund Halley, with whom the guest of the evening was connected by family relationship, and expressing pleasure at finding ministers of the gospel, like Mr. Halley, devoting such time as they can spare from the duties of their high calling to the study and advancement of scientific knowledge. He also alluded to the enlightened policy pursued by some of the religious bodies in sending out as missionaries men well informed in scientific matters, and thereby qualified to take advantage of the new fields of research open to them, and to aid in the advancement of science while labouring for the cause of religion and civilization. He concluded by proposing the health of Mr. Halley, with cordial wishes for a pleasant journey and a safe and speedy return. Mr. Halley, in responding to the toast, thanked the members for the honor they had done him in twice electing him as one of their vice-presidents, as well as for their invitation on the present occasion, and pointed out various lines of investigation which could be undertaken with advantage by the members of the Club, urging upon them the desirability of following up special branches of knowledge till they attained proficiency in them, and qualified themselves to deal with our natural productions in a much more complete manner than could be done by naturalists, however able, who have not the advantage of an acquaintance with the objects of their studies in a fresh or living state. Mr. Halley then proposed prosperity to the Club, which was suitably responded to by Mr. Watts, and after one or two other toasts the party separated with three hearty cheers for Mr. Halley, after having spent a most pleasant evening.

We had not received a report of the usual meeting of the Field Naturalists' Club of Victoria, previous to going to press.



LECTURES.

THE STORY OF THE EARTH,

AS REVEALED IN THE ROCKS.

Mr. Wm. Denton, of Massachusetts, America, at present on a lecturing tour through Australia, commenced a series of lectures, entitled "The Story of the Earth," in the Athenæum Hall, Melbourne, on Monday, 25th July, the large hall being closely packed in every part, many not being able to obtain seats.

Mr. Denton has a fluent delivery, with a happy choice of expression, and a style suitable for a mixed audience. It is to lectures of this class we must look to command the attention of the masses and enable them to learn something of the beautiful stories of Nature, which otherwise might remain for ever a sealed book, except to those who desire of themselves to unravel its mysteries. We therefore hail with pleasure the visit of Mr. Denton as likely to prove of material benefit to the people of Melbourne, who have crowded nightly to listen, with evident satisfaction, to a plain and popular narration of the grandest epic of the Universe. The lecturer began by showing that a study of geology would be profitable commercially. "Show me the geology of a country, and I will at once point out the best land, the best sites for farms, and the best positions for towns and cities." This study also improved the intellect, there being no other science which could give man more knowledge on what to build up his philosophy. If it is interesting to learn what has been done on this Earth during the last four thousand years, how much more interesting must it be to learn the story of millions of years previously. A brief description of the vicinity of Melbourne was given to show that within a very short time—geologically speaking—this part of the globe has been under water. In Studley Park was a bed of sand 250 feet above the sea level; digging down we find the same indications, in the form of sandstone or sand compacted together, each grain of which tells its own story how it was formed by the action of water. Massive rocks had been ground down under water and deposited in strata. In every portion of the globe vast tracts of stratified rocks were to be found, indicating that water had done much to form the surface of this planet. Another element, fire, had also done its share. Thus we found two agents at work making the Earth what it is: the resulting fiery rocks and watery rocks were to be found everywhere. Within three miles of this city we can see the fiery rocks, or lava. Lava, by pressure, in time, would make a rock very like granite, and in granite we have the great underlier, the foundation of this Earth. When we have discovered this we see that this planet was at one time a fluid mass of fire from its centre to its exterior. Various instances were then given of the lecturer's own experience in descending mines, to show the increase of heat as we descended, at an almost constant rate of 1° for each 50 feet. Boiling springs were described, also volcanoes, all telling the same tale. The story of Vesuvius was told in eloquent language that fairly held the audience spell-bound, while the sad catastrophe that befell Herculaneum and Pompeii was described so as to send a thrill of horror through the listeners, not one of whom perhaps had

ever fully realised the awful nature of this great calamity. The lecturer maintained that all these facts pointed in one direction, that is, the present fiery condition of the interior of the globe, and, as a consequence, the fiery condition of countless ages in its past history, and the fiery beginning of this planet. Applause was frequent during the lecture, and on its conclusion a very fine series of views were shown, by means of the oxy-hydrogen light, to illustrate the various facts that had been narrated.

The second lecture was delivered on 28th July, and was equally interesting, describing the many and violent changes that took place on the Earth's surface, from the time the planet began to cool until the deposition of carboniferous rocks; a period that must have extended over countless ages.

The lecturer, in forcible yet simple terms, described the long continued combats between fire and water, showing how slowly, yet surely, the cooling element became victorious; cleaving, bursting, and grinding masses of fiery lava, reducing them to the consistency of mud, and depositing this mud over immense masses of fiery rock, then to be metamorphosed under the combination of heat and steam, until gradually the surface became cooled sufficiently to allow the growth of plants, which at this period attained gigantic proportions under the influence of a hot steaming atmosphere, although, their forms were of the simplest description, represented in our days by the very lowly forms of club mosses. Without entering on the vexed problem of the first appearances of life on this globe, the lecturer rapidly described how the surface of the Earth was in time fitted to become the abode of living animals, and how the earliest forms of life had run their course and left their imprints in the shape of fossils imbedded in rocky deposits of immense thickness, indicating their formation during countless thousands of years. The study of these fossils was of practical utility, indicating the period when they were deposited, and thus showing where we need not look for coal. The geological surveys in America had in this manner saved millions of money. Petroleum, or rock oil, was then described, by the lecturer, as being really the oil of vast myriads of animals that had lived and died upon the Earth during countless ages, forced by the mighty energies of Nature into the caverns of the Earth, where it had been discovered by man, yielding wealth to a fabulous extent. This highly interesting lecture was followed by the exhibition of very good pictures of fossils and other objects alluded to during the evening.

The third lecture was given by Mr. Denton on Friday evening, 29th July, when again a crowded audience evidenced the great interest taken in the subject. Although each lecture is, properly speaking, part of a series, yet, as many people cannot possibly attend all, Mr. Denton has so arranged matters that each lecture is complete in itself, opening with a rapid yet perfectly clear sketch of the early history of the Earth, and then fully detailing further periods in the annals of its formation. In this way the audience at the third lecture were quickly made acquainted with that part of the story told in the two previous lectures, which brought the subject up to the Carboniferous

period, one of the most important periods of the formation of the Earth's crust, as it was then that the coal measures were deposited, forming immense stores of fuel for the use of its future inhabitants. And as these stores had now been opened up and fully examined, the fossils contained therein had been studied and systematically arranged to a greater extent than in any of the other periods of the Earth's development. These fossils were then fully described, and were shown to consist almost entirely of plants. Vegetable matter under great pressure decomposed very slowly when air was excluded, first forming beds of peat, then becoming under pressure of superincumbent beds converted into lignite, and finally into coal as the pressure was increased from above by the deposit of additional masses of mud, sand, and water, the previously deposited beds of vegetable matter sinking by their own weight or by compression, forming hollow basins on the surface. In this way many successive layers of coal had been found. The lecturer then went on to describe the permian formations succeeding the coal measures, and noting the fact that the fossils of the permian rocks, while consisting to a great extent of plants similar to those of the carboniferous period, yet showed a gradual decrease in size and number: this was adduced as evidence that the Earth was gradually cooling. The permian and new red sandstone formations were then fully described, including the salt mines of Cracow and other places. A fine series of photographs of fossils illustrating the periods described were then exhibited by the oxy-hydrogen light, and the audience dispersed, evidently well pleased.

NOTES, MEMORANDA, &c.

The Proceedings of the Linnean Society of New South Wales, part iv of vol. v., for the last quarter of 1880, contains 180 pages of original contributions, all of the most interesting character. The President Rev. J. E. Tenison-Woods, F.G.S. contributes two articles on Corals from the north-east coast of Australia, a subject that has been most carefully investigated lately by this eminent Geologist. Mr. E. P. Ramsay F.L.S., contributes descriptions and figures of four new species of Australian fishes. The Rev. Dr. Woolls, F.L.S., concludes his description of species of Eucalyptus in the county of Cumberland, N. S. W., Parts iii, iv, v, being given in the present volume. That rising young naturalist Mr. W. A. Haswell, M.A., B.Sc., continuing his labours on Australian Crustacea, gives Part i of what promises to be a useful paper on Australian marine *Isopoda*, describing 17 new species illustrated by carefully drawn figures. Mr. J. Brazier, C.M.Z.S., contributes three articles on Australian Mollusca, one being a valuable list of species of *Cypræa* found in Moreton Bay, comprising 27 species. The Hon. Mr. Macleay, F.L.S., contributes part of his descriptive Catalogue of Australian fishes. An immense labor is entailed in producing a paper of this kind: the second part brings the number of species up to 543, the descriptions being very full and complete.

Dr. J. C. Cox, F.L.S., contributes Notes on the Habits and Customs of Australian Natives in Queensland, and the volume concludes with the annual address from the Presidential chair, in which the Rev. J. E. Tenison-Woods congratulates the members of the Society on its steady and substantial progress, and then gives a rapid and comprehensive review of the general progress of scientific investigations in the Australian colonies within the last few years, and a sketch of the geological character of the East and South coasts, showing the well marked difference between the two. Then follows a relation of some facts connected with the history of the development of Australian Geology, giving a quotation from a letter written by Sir Charles Lyell many years ago to show that the only means of arriving at a satisfactory solution of the difficult problems connected with the age of our tertiary deposits would be obtained by making a careful and complete examination of the marine Zoology of these waters, and narrating the author's own early labors in this direction, and the subsequent attempts by Mr. Selwyn and others to classify the tertiary deposits of Victoria, all of which, however, seem to have left the subject still uncertain, indicating clearly that the problem will never be solved except on the line of inquiry suggested by Sir Charles Lyell. In this direction the labors of the Linnean Society of New South Wales within the last few years have been more valuable than all that had been previously effected. Then follows a glance at the progress of Natural Science during the past year in other parts of the world. And the address concludes with a note of congratulation on the extensive and untouched fields of investigation which are still open in this country.

In concluding this notice of the present volume we can only add that there are eight plates of carefully prepared drawings to illustrate the various papers, and we must congratulate the Society on the large amount of industry and zeal, enabling its members to make such efficient additions to our knowledge of the fauna and flora of Australia.

"The Fern World of Australia" is the title of a handy volume, just published in Queensland, from the pen of F. M. Bailey F.L.S., the author of "Queensland Ferns," and many other contributions to the scientific knowledge of Australian Cryptogams, &c. The work before us contains a full description of all known Australian Ferns, systematically arranged on the basis of classification adopted in vol. VII of Bentham and Mueller's "Flora Australiensis," with remarks on their habitats. Besides giving a full list of common English names, the author in his introduction explains in a simple manner the structure of ferns and the terms used in describing them, to which is added a note on collecting and cultivation, which ought to afford substantial aid to every one interested in these lovely plants, either in collecting for the mere pleasure, or with a view to a more intimate study of peculiarities of their structure and classification. A few pages are given to aid Queensland collectors by arranging the ferns of that Colony in groups according to their habitats, which will also be useful to collectors in Victoria and other colonies, as three-

fourths of the whole number of species are common to the whole of Australia. The bulk of the book is occupied with the systematic arrangement and description of species divided into six tribes, 38 genera, and about 280 species and varieties. There are also given descriptions of about 20 species of the larger mosses that are commonly met with in cultivation. The glossary of terms will be useful, also the list of authorities for generic and specific names. There is a copious index in which each species is followed by the synonyms by which it has been noticed in works on Australian ferns; these are given in italics, so as to be readily distinguished. There are also two plates. Taken altogether, the book forms a very handy compendium of a subject in which many people are interested, and we have no doubt the author's endeavors to make everything plain and easily understood will meet with the reward such industry deserves.

In our first number we directed attention to an admirable little work "Zoological Exercises for Students in New Zealand," by Professor F. W. Hutton. We have now to welcome another equally useful production from the same author,* issued by the Colonial Museum and Geological Survey Department. Too much praise cannot be given to the work. The manner in which the histological examination of a common plant is directed is excellent, and ought to be comprehended by the veriest tyro. In a pamphlet of sixteen pages the author makes clear the proper steps in dissecting a plant so as to give a full knowledge of its intimate structure. The subject is divided into seven parts. After first giving the general character of the plant selected for examination, the following divisions deal respectively with the stem, the root, the leaf, the flower, the fruit, and the mode of growth; the whole being fully illustrated by simple wood-cuts. As the "Shepherd's Purse" is common here, springing up as a weed in most gardens, Professor Hutton's pamphlet is equally useful for Victorian students, and we cordially recommend every student to procure it; and, with us, hope for many successive pamphlets from the same source.

In order to meet a want that has often interfered with the progress of collectors through being unable to obtain the proper names of the objects they collect, we have solicited the assistance of several gentlemen who are known to be reliable authorities on such subjects. They have readily responded to our wishes and have intimated their willingness to supply names of objects submitted to them for this purpose. *Coleoptera*, *Lepidoptera*, *Mollusca*, *Bryozoa* or *Polyzoa*, *Hydroid Zoophytes*, *Ferns* and Botanical specimens generally, and fossils of any description, may be sent to us and the names will be returned immediately by post, or published in our pages. Collectors are advised to adopt the plan of numbering each object sent, keeping a duplicate with the same number attached; where collectors have only a single specimen, or the specimens sent are valuable commercially, they will always be returned direct.

* "Studies in Biology for New Zealand Students." No. 1—The Shepherd's-purse (*Capsella bursa-pastoris*). By F. W. Hutton.

THE
SOUTHERN SCIENCE RECORD

MELBOURNE, SEPTEMBER, 1881.



A NEW TREE FROM THE NEW HEBRIDES.

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph. D., F.R.S.

Aristotelia Braithwaitei, n. sp.—Leaves on very short stalks, ovate-lanceolar, gradually acuminate, remotely and acutely denticulated; flowers large; primary flower-stalks very short, from the axils of the uppermost leaves or lateral; stalklets 2-4 together, about as long as the flowers; sepals oblong, or linear-lanceolar, not much shorter than the corolla, slightly downy; petals narrowly oblong-cuneate, fringe-like lobed at the summit, velvet-downy along the margin and towards the base inside; stamens 17-20; filaments hair-like, elongated; anthers rather long, extremely narrow, opening at the apex only; receptacle ovary and lower portion of the style velvet-downy; fruit large, globular, four-celled; pericarp thick; endocarp very hard; seeds large; radicle extremely short.

In irrigated forest-valleys of Tanna.—A tree of moderate size. Leaves opposite or occasionally some scattered, of thin-papery consistence, 1-1½ inches long, remotely penni-nerved, glabrous above, paler slightly downy and not shining beneath. Stalks and stalklets of the inflorescence also short-hairy. Flowers bi-sexual. Sepals 4 or oftener 5, fully half an inch long, scantily downy; petals except their short-lobulated summit placed induplicate-valvular while in bud; filaments about one third longer than the anthers, glabrous; anthers ⅓-½ inch long, linear-cylindrical, slightly short-hairy, bearded at the top; style about half an inch long, thin, awl-shaped, smooth towards the undivided summit. Stigma extremely minute. Receptacle depressed-hemispherical, slightly folded, hardly above ⅓ inch high. Ovary 4-celled, with 2 ovules in each cell; fruit measuring 1-1½ inch, outside red, terminated by a very short blunt apex; one or more of the fruit-cells seedless. Pericarp about ¼ inch thick, radiate-fibrous, hardly succulent. Seeds erect, maturing solitary, nearly egg-shaded, ¼ to ½ inch long; ultimate integument adhering, membranous, pale-brownish, smooth. Albumen amygdaloid. Embryo nearly as long as the albumen, almost white; cotyledons oblong-oval, flat, many times longer than the minute basal radicle.

Flowering branchlets and separate ripe fruits were brought by Captain George Braithwaite, Commander of the mission-vessel "Day-spring," and brother of Dr. Robert Braithwaite, renowned for his microscopic researches, especially bryologic. This beautiful plant is nearest related to *A. megalosperma* (F. v. M. Fragm. ix, 84), from North Queensland; leaves, so far as known, shorter and more distantly denticulated; flowers larger; stamens longer and more numerous; style elongated; ovary velvet-downy; fruit larger and quite globular.

This species is of very particular interest, as it demonstrates more than others, unless *A. megalosperma*, the close alliance existing between the genera *Elæocarpus* and *Aristotelia*, and as it shows, once more, that generic limits can ultimately only be defined, when all respective species have been discovered. In the large size of the flowers, in the aestivation of the petals and the hardness of the putamen, *A. Braithwaiti* coincides with *Elæocarpus*; but in its opposite thin leaves, in its inflorescence and inferior radicle, it remains an *Aristotelia*.

Hitherto no species of this genus was known from Polynesia, though one (*A. Papuana*, F. v. M.) occurs in New Guinea. Of the other recorded congeners one inhabits Chili, one or possibly two belong to New Zealand, one to New South Wales, one (as already remarked) to Queensland, and one to Tasmania. The additional one, now brought under notice from the South Sea Islands, has, on account of its large-sized flowers, claims for ornamental culture.

OOLOGY OF AUSTRALIAN BIRDS.

By A. J. CAMPBELL.

PART I.

On account of the lively interest taken throughout the colony in the eggs of Australian birds, I propose to give a series of papers on the subject, describing the eggs as far as known, according to the late Mr. John Gould's handbook, filling in a few observations and descriptions of eggs, from my own collection, that were not discovered or escaped the notice of Mr. Gould and other well-known ornithologists.

The general locality of the birds will also be shown, principally according to Mr. Gould, with extensions stated on Mr. Ramsay's tabular list, Mr. Swan's Tasmanian list, and a few observed by myself in Victoria.

ORDER—RAPTORES.

FAMILY—*Falconidae*.

1. *AQUILA AUDAX*—(Wedge-tailed Eagle). *Locality*—Australia and Tasmania. *Egg*—Clouded with large blotches of pale purple, and small specks and dashes of yellowish umber-brown on a stone-colored ground. Length, 3 inches; breadth, $2\frac{1}{2}$ inches. I have had specimens $2\frac{3}{4}$ inches by $2\frac{1}{8}$.

2. *HIERETUS MORPHNOIDES*—(Little Eagle). *Locality*—Australia except North, and Victoria. *Egg*—Bluish white, with very faint traces of brown blotchings. Length, 2 inches 2 lines; breadth, 1 inch 9 lines.

3. *POLIOÆTUS LEUCOGASTER*—(White-bellied Sea-eagle). *Locality*—Australia and Tasmania. *Egg*—Dull white, faintly stained with reddish brown. Length, 2 inches 9 lines; breadth, 2 inches 3 lines.



4. *HALIASTUR LEUCOSTERNUS*—(White-breasted Sea-eagle). *Locality*—North Australia, Queensland, and New South Wales. *Egg*—Dirty white, having the surface spread over with numerous hair-like streaks, and very minute dots of reddish-brown, the former prevailing and assuming the form of hieroglyphics. These singular markings being most numerous at one end, sometimes at the larger, other times at the smaller. Length, 2 inches 2 lines; breadth, 1 inch 8 lines.

5. *HALIASTUR SPIENURUS*—(Whistling Eagle). *Locality*—Australia. *Egg*—Bluish white, slightly tinged with green, the few brown markings with which they are varied being very obscure, and appearing as if beneath the surface of the shell. Length, 2 inches 3 lines; breadth, 1 inch 9 lines.

6. *PANDION LEUCOCEPHALUS*—(White-headed Osprey). *Locality*—Australia and Tasmania. *Egg*—Yellowish white, boldly spotted and blotched with deep reddish brown, which color in some specimens is so dark as to be nearly black; again, other specimens are clouded with large blotches of purple, which appear as if beneath the surface of the shell. Medium length, 2 inches 5 lines; breadth, 1 inch 9 lines.

8. *FALCO MELANOGENYS*—(Black-cheeked Falcon). *Locality*—Australia and Tasmania. *Egg*—Ground color buff; but this is scarcely perceptible from the predominance of the blotches of deep reddish chestnut with which it is marbled all over. Length, 2 inches 1 line; breadth, 1 inch $7\frac{1}{2}$ lines.

10. *FALCO LUNULATUS*—(White-fronted Falcon). *Locality*—Australia and Tasmania. *Egg*—Light buff, blotched and marbled all over with dark buff. Length, 1 inch 10 lines; breadth, 1 inch 4 lines.

11. *HIERACIDEA BERIGORA*—(Brown Hawk). *Locality*—Australia and Tasmania. *Egg*—Very beautiful, varying in color, and are seldom found alike; they are also longer, or of a more oval shape than those of the generality of Falcons; the prevailing color is the ground buff white, covered nearly all over with reddish brown. In some specimens an entire wash of this color extends over nearly half the egg, while others are blotched or freckled with it, in small patches, over the surface generally. Medium length, 2 inches 2 lines; breadth, 1 inch 6 lines.

12. *HIERACIDEA OCCIDENTALIS*—(Western Brown Hawk). *Locality*—South and West Australia, and Victoria. *Egg*—Varies in intensity of color, but differs in little or nothing from that of *H. berigora*.

13. *TINNUNCULUS CENCHROIDES*—(Nankeen Kestrel). *Locality*—Australia. *Egg*—Freckled all over with blotches and minute dots of rich reddish chestnut on a paler ground. Length, $1\frac{5}{8}$ inches; breadth, $1\frac{1}{4}$ inches.

17. *ASTUR APPROXIMANS*—(Australian Go-hawk). *Locality*—Australia, except North, and Tasmania. *Egg*—Bluish white, smeared over with blotches of brownish buff. Length, 1 inch 10 lines; breadth, 1 inch 5 lines.

19. *ACCIPITER TORQUATUS*—(Collared Sparrow-Hawk). *Locality*—Australia and Tasmania. *Egg*—Bluish white, in some instances stained and smeared over with buff; in others square formed spots, and a few hair-like streaks of deep brown. Medium length, 1 inch 6 lines; breadth, 1 inch 2 lines.

21. *MILVUS AFFINIS*—(Allied Kite). *Locality*—Australia. *Egg*—Bluish or greenish white with large defined blotches, as well as small, of reddish brown at intervals over the shell. Length, 2 inches; breadth, $1\frac{1}{2}$ inch.

I believe this is the first time this egg has been described. It is in my collection, and was taken near Geelong in 1880. There were two eggs in the nest.

22. *MILVUS ISURUS*—(Square-tailed Kite). *Locality*—Australia, except North. *Egg*—Ground color buffy white, faintly freckled with rufus, becoming much deeper at the smaller end, others very largely blotched with reddish brown; somewhat round in form. Length, 1 inch 11 lines; breadth, 1 inch 7 lines.

24. *ELANUS SCRIPTUS*—(Letter-winged Kite). *Locality*—Australia, except North. *Egg*—White ground, blotched and marked with reddish brown, darkest at smaller end; markings easily removed by wetting. Length, $1\frac{1}{4}$ inches; breadth, $1\frac{3}{8}$ inches.

25. *BAZA SUBCRISTATA*—(Crested Hawk). *Locality*—Queensland and New South Wales. *Egg*—Pure white. Length, $1\frac{5}{8}$ inches; breadth, $1\frac{1}{4}$ inches.

26. *CIRCUS ASSIMILIS*—(Allied Harrier). *Locality*—Australia, except North, and Tasmania. *Egg*—Pure white. Length, $1\frac{7}{8}$ inches; breadth, $1\frac{1}{2}$ inches.

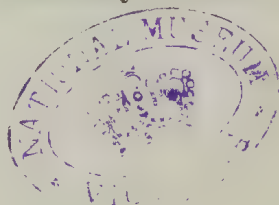
CIRCUS JARDINII—(Jardine's Harrier). *Locality*—Queensland, New South Wales, Victoria, and South Australia. *Egg*—Same description as *C. assimilis*.

Family—STRIGIDÆ.

34. *HIERACOGLAUX CONNIVENS*—(Winking Owl). *Locality*—Australia. *Egg*—Pure white, somewhat round in form and large for size of the bird. Length, 2 inches; breadth, $1\frac{5}{8}$ inches.

36. *SPILOGLAUX BOOBOOK*—(Boobook Owl). *Locality*—Australia and Tasmania. *Egg*—Perfectly white, unusually round. Length, 1 inch 7 lines; breadth, 1 inch 4 lines.

The author will be glad to receive any corrections on the foregoing paper.



PROCEEDINGS OF SOCIETIES.

THE BENDIGO SCHOOL OF MINES SCIENCE SOCIETY.

INAUGURAL ADDRESS BY THE PRESIDENT, P. H. MACGILLIVRAY, M.A.,
M.R.C.S., F.L.S.

The object of Physical and Natural Science is, in the first place, to acquire a knowledge of phenomena and, secondly, to correlate these, and, as far as possible, to ascertain the causes by which they are produced—in other words, to learn the laws by which the Universe is governed. It endeavors to ascertain the nature of all things, and is as much occupied with the investigation of the infinitely small, as with that of the infinitely great. No one can have any but a general knowledge of so vast a field, and it is necessarily divided into many parts, with many workers devoting themselves to special departments. The magnitude of the objects which we endeavour to investigate bears no proportion to the difficulty of their study, or to the importance of its bearing on science. The popular mind regards with reverence the astronomer seeking to resolve with his telescope some far distant nebula, while it looks with a feeling akin to amusement on the microscopist examining the contents of a drop of water, or tracing the structure of an organism all but invisible to the unaided eye. It is difficult for the non-scientific to appreciate the fact that it requires as much knowledge, as much energy, as much ability to trace the life history of a beetle or a daisy as to weigh the Sun or measure the orbit of a comet. In the laws of life, growth, and development, especially, it is to the minute investigation of seemingly trivial objects that we are indebted for a large proportion of the knowledge we possess. We there find the organs and tissues reduced to their most rudimentary elements, and gain a clue to the resolution of the most complex structures. Let no one despise the worker for the smallness of his field, but let him reflect that it is mostly to such minute investigations that we are indebted for what we know of biological science. A great painter has said that his art can only be acquired by the painting of little bits, and assuredly no one can understand much of science without studying little things. The beauty, order, and mystery of Nature are as much shown in the lowliest organism we tread under foot, as in the most glorious sphere which blazes in the heavens. Tennyson has well said :—

“ Flower in the crannied wall,
I pluck you out of the crannies—
Hold you here, root and all, in my hand,
Little flower,—but if I could understand
What you are, root and all, and all in all,
I should know what God and man is.”

Many persons, even among the educated, are apt to judge of the value of science by its direct application to utilitarian purposes and the money it brings to the pocket. They can appreciate the science which results in the invention of the steam engine or the electric telegraph, but they cannot understand any person devoting his energies to the unravelling of the mysteries of the life around us for knowledge sake alone. They cannot understand a palæontologist examining the

remains of bygone life in our rocks, unless it is to search for indications of a coal seam or a gold vein; and the utmost benefit they can see from the labours of the botanist is the discovery of some hitherto unknown medicinal properties in the plants he analyses. Their constant question is *cui bono*?—what is the use of it? To such it is useless to speak of the beauty of knowledge. They cannot understand it, and the inherent craving for knowledge which exists in the human mind has been rubbed out in the narrow groove of money-making into which their faculties have been compressed. They should, however, recollect that, looking at it even from their own low stand-point, it is impossible to say to what important material results the most seemingly useless observations may lead.

In nothing has the resistless progress of the human mind been more strongly shown than in the recent immense development of all branches of physical science. When we consider how short a period has elapsed since the electric telegraph was invented, and the almost daily additions to the wonderful practical results of science, it is impossible to conceive any limits to its discoveries or to the uses to which they may be applied. In every department of life, in everything which contributes to our necessities, our comforts, our luxuries, we see the magic hand of modern science. In physics and astronomy the discoveries of the last few years have gone far beyond what the wildest dreamer could have imagined. Who, for instance, could have believed it possible to submit the Sun to chemical analysis; and yet the spectro-scope has already largely revealed the composition of that body. No less wonderful have been the discoveries made in electricity, magnetism, heat, and, in fact, in all departments of physics.

The additions to our knowledge of natural science are not so well-known, as they do not come so prominently before the public. They have, nevertheless, been very great. Many important contributions to botany have been made, including Bentham's great work on the Flora of Australia. In our knowledge of all branches of zoology, but more especially in those treating of the lower groups, the advance has been immense. We now know that the greatest depths of the sea are not, as was supposed, destitute of life, but are peopled by an abyssal fauna of their own. The difficult subject of embryology has engaged a great deal of attention, and has been diligently and successfully studied by many able observers. So, also, the discoveries in geology and palæontology have been numerous and important.

Chief among scientific events of recent years has been the promulgation of Wallace and Darwin's theory, and especially the publication of the latter naturalist's work on the Origin of Species by means of Natural Selection. It is impossible to over-estimate the importance of this work, and the immense impulse it gave to the more thorough study of everything that is included in the term Natural History. In it is, for the first time, suggested a rational clue to a knowledge of the means by which species might be formed, without requiring a special act of creation for each. It led to a minuter examination of those already known, to a more careful comparison of the various forms as to their distribution, their variations, the possible influences of localities, of climates, and of physical conditions of all sorts. Most naturalists are now agreed that evolution to, at all events, a large extent has

taken place in the animal and vegetable kingdoms, and that this can be largely explained by Darwin's theory of Natural Selection, assisted by some other influences. Several of the veteran leaders of science are, however, still strongly opposed to it. Whether we believe in the truth of evolution in the extreme form of the development of man from a monad, or only partly, or disbelieve it altogether, we cannot but admire the immense knowledge, wonderful sagacity, and perfect fairness of statement exhibited in all Darwin's works.

Coming now to the subject of the present Society, I have a few words to say as to the reason of its proposal and the objects which I think it may accomplish. Thanks to the numerous periodicals devoted to scientific subjects, and the large quotations in the lay press, there is now a good deal of what may be called general promiscuous knowledge of physical science, and much interest is taken in its practical applications. The able teachers in our School of Mines have also developed a taste in their students for such pursuits. The desire for further knowledge of these subjects is shown by the large attendance at the lectures which are occasionally given in Sandhurst by scientific men. Under these circumstances I think that much good may be done by those who have a special knowledge of particular subjects giving short explanations, papers, or illustrative experiments, more especially in connection with recent discoveries or new applications. It is not expected that many, if any, important original observations will here be presented, but that members will enlighten each other on the prominent results of the labors of those who are adding so greatly to our knowledge elsewhere. I am satisfied that not only will we be enabled to add to each other's knowledge, but to interest those who have not hitherto interested themselves in scientific investigations, and to induce them to attempt them for themselves.

With the exception of geology, which is so admirably taught by Mr. Nicholas, and which many have studied for themselves, owing to its practical bearing on mining operations, our local natural history is almost entirely unknown. The country around Sandhurst is rich in both animal and vegetable forms. The botany has, I believe, been examined by very few, and to the great mass is unknown. The birds are numerous and beautiful, and yet there are only a very few persons in the district who know anything about them, or would recognise any but one or two of the commonest sorts. The same may be said of all the other groups of the animal kingdom. It would surely add to the interest of even a ramble in the bush to know something of the flowers and animals around us—something of their different kinds, their seasons, their habits, or their structure. We would all wish to be something better than him of whom Wordsworth says:—

“A primrose on the river's brim
A yellow primrose was to him,
And it was nothing more.”

If those of us who have paid attention to such subjects would exhibit specimens of our flora and fauna, explaining the structure and giving any information we can, there is no doubt that an intelligent interest in the natural history of the district would be developed.

I trust that members will not be too diffident in contributing papers or information on any scientific matters coming within the scope of the Society, and I can safely promise them indulgent critics.

In conclusion, gentlemen, I would express my firm belief that if we only exert ourselves, the Bendigo School of Mines Science Society may be made a power for good in promoting a taste for the higher knowledge amongst us.

THE ROYAL SOCIETY OF VICTORIA.

The Royal Society of Victoria held its ordinary meeting on Thursday, August 11th. The President, Mr. R. L. J. Ellery, F.R.S., in the chair. There was an unusually large attendance of members and visitors. Messrs J. Stirling and Culcheth were elected members, and several new members and associates were nominated.

Mr. Wm. Nicholas, F.G.S., read a very interesting paper on "The Origin of Quartz Reefs and Gold," giving a mass of evidence to prove that Victorian auriferous laminated quartz reefs were simply altered auriferous slates or clayey sandstones; a theory in direct opposition to previous theories, which generally went to show that quartz had been formed in water, filling fissures that had been formed in the bed rocks. Mr. Nicholas illustrated his theory fully by drawings on the blackboard, and also by a large series of interesting rock specimens obtained from the principal mining reefs in the vicinity of Sandhurst. The field of enquiry opened up by the paper proved to be so wide that the discussion thereon was postponed to a future meeting, the paper in the meantime to be printed and circulated amongst the members.

Mr. J. Cosmo Newbery then read a paper, being "Remarks on the Specification of a Recent Patent for the Manufacture of Gas," which the writer described as a most extraordinary specification, and proceeded to show the absurd nature of its contents, which, for the sake of clearness, he had divided into paragraphs. These were severally shown to be simply nonsense, and Mr. Newbery's remarks thereon caused frequent bursts of laughter as he exposed the incongruity of the strange mixtures proposed by the patentee. Some of these, besides being absolutely ridiculous, were actually not used at all in the subsequent directions for making gas. Explicit directions are given to prevent the approach of water in any form, while mixing certain chemicals, which are at the same time directed to be mixed with water to the extent of more than one half of the whole mixture (!) Another mixture consists of a strongly acid solution of chloride of zinc, 800 parts, with kerosene, 8000 parts (!)—a mixture of fluids which would not mix! Among so many absurd mixtures it is difficult to select the most absurd, but we think the palm may fairly be given to what is styled in the specification "Retort Charge No. 1," which directs that chemically clean scales and weights are used to weigh out one part of iron, to be dissolved in nitro-muriatic acid in an iron vessel (!) Kerosene is directed to be used as a flux, where in no sense of the word could kerosene act as a flux, and kerosene is directed to be used "to any required amount" (!) Tin is directed to be dissolved in nitric acid,

although it is well known that nitric acid, instead of dissolving tin, will convert it into an insoluble oxide. The gas when made is passed through a purifier of iron and lime, but iron and lime are usually used to remove sulphur and carbonic acid, and this gas contains neither. In concluding, Mr. Newbery stated that there was nothing introduced into the retorts that would produce an illuminating gas, excepting kerosene, and that the manufacture of kerosene gas is in no way aided by the mixtures mentioned. Several members, amongst whom were Mr. C. R. Blackett, Mr. Foord, and other chemists, addressed the meeting, each fully endorsing the opinions advanced by Mr. Newbery; and a resolution to the same effect proposed by Mr. Sutherland, and seconded by Mr. Kernot, was carried unanimously.

Two other papers were taken as read, one by Mr. H. Sutton, "On a New Vacuum Apparatus," and one by Mr. Maplestone, being "Observations on living Polyzoa."

In the course of the meeting the President referred, in most feeling terms, to the great loss sustained by the Society in the untimely death of Mr. F. J. Pirani, and it was unanimously resolved that a letter of condolence should be sent to Mrs. Pirani.

Before the conclusion of the meeting Mr. W. C. Kernot exhibited some experiments on electricity, to show the manner of using M. Faure's secondary cells, two of which, constructed by Mr. Kirkland, were shown. These had been charged at the Dynamo-electric machine belonging to the Electric Lighting Company, and their simplicity, and the ease with which they were manipulated, gave general satisfaction. Platinum wire was fused, a small electric motor was set to work, and several pretty experiments were shown with a small induction coil, the secondary cells supplying all the electric force required. Every one present expressed their pleasure and astonishment at the result. Although the cells were small they were sufficient to illustrate the principle on which they worked, sufficient being shown to indicate that M. Faure's discovery would probably soon lead to a more general use of electricity.

THE ROYAL SOCIETY OF NEW SOUTH WALES.

ORDINARY MEETING.

The monthly meeting of the Royal Society of New South Wales was held on August 3rd, the president (Mr. H. C. Russell, B.A., F.R.A.S.) occupying the chair. There was a moderate attendance of members. The minutes of the previous meeting having been read, a ballot was taken, which resulted in the election of the following gentlemen as members of the Society, viz:—Messrs Thomas Evan, Richard Edward O'Connor, M.A., Henry Ling Roth, F.S.S., F.M.S., T. W. Shepherd, L. E. Threlkeld, Richard Watkins. Mr. Russell stated that he had received a letter from the United States Astronomer asking him to make particular observations of the transit of Mercury in November next. He hoped to have one or two stations in the country, and he was taking preliminary steps for observing the transit of Venus in December, 1882. Forty-three donations received during the month were duly acknowledged.

Mr. W. A. Dixon, F.C.S., read a paper "On the inorganic constituents of some Epiphytic Ferns." In moving a vote of thanks for this paper, the Hon. Professor Smith remarked that the subject appeared to open out a new line of investigation, which would, no doubt, prove valuable. Mr. H. C. Russell, B.A., F.R.A.S., then read a paper "On new Double Stars and measures of some of Herschel's." A cordial vote of thanks was accorded to the Chairman for his valuable and interesting paper, and the meeting then terminated.

ASTRONOMICAL SECTION.

The monthly meeting of the section for astronomy, in connection with the Royal Society of New South Wales, was held at the Society's house, Elizabeth-street, on Friday evening, 5th August, Mr. H. C. Russell, F.R.A.S., in the chair. Mr. Russell exhibited a "Plante-Faure" cell, which he has had made in Sydney. It was only finished on the afternoon of the same day, and had been charged by the powerful bichromate of potash battery at the Observatory. It was made in the same way as those submitted to Sir William Thompson, and had nearly the same power as one of the four sent to Sir William Thompson from Paris. As the cell was exhibited with its first charge there had been no time to measure the quantity, but it was probably equal to 200,000 foot pounds. The only experiments were hurriedly got up, and consisted in burning thick platinum foil. Steel wire, platinum wire, and thick copper wires were fused together. A paper on the longitude of Mount Lambie, by Mr. W. J. Condor, was read, describing the methods used in arriving at the longitude. A paper by Mr. J. Tebbut, F.R.A.S., on the elements of Comet II., 1881, was also read. A discussion ensued, and the meeting then terminated.

MICROSCOPICAL SECTION.

The usual monthly meeting of the Microscopical Section of the Royal Society of New South Wales was held at the Society's Rooms, Elizabeth-street, on Monday evening, the 8th August. Dr. Wright occupied the chair. There was a good attendance of members. After the transaction of the usual formal business, those present had an opportunity, through the kindness of Mr. L. Bruck, of examining a variety of new and interesting microscopical apparatus. Foremost amongst these exhibits were two large and completely furnished microscopes, by M. Hartnack, of Paris, and by Messrs Schmidt and Hänsch, of Berlin—instruments representing the best style, in form and finish, of Continental microscopes. Considerable interest was taken in the trial of Professor Abbe's new condenser for very oblique illumination, which it was found could be worked to an extremely high angle. A. Loewe's microtome and Hartnack's improved stereoscopic binocular eye-piece also received a great amount of attention, and were much admired. Dr. Wright submitted for distribution two samples of fossil diatomaceous deposits, the one from Victoria and the other from Gunnedah; and Mr. P. R. Pedley exhibited sections of brain and spinal cord.

The usual report of the meeting of the Royal Society of South Australia had not arrived before going to press.

THE ROYAL SOCIETY OF TASMANIA.

The monthly evening meeting of the Society was held on Monday, the 8th August, Mr. T. Stephens, M.A., F.G.S., in the chair.

The following persons were, on the nomination of the Council, unanimously elected honorary Members of the Society, viz :—

Mrs. Charles Meredith, of Launceston, “in recognition of her long efforts to encourage the study of the Natural History of Tasmania, by illustrations both literary and pictorial, in her various and highly popular publications.”

Mr. James Smith, of Westwood, Forth, “in recognition of his rare perseverance and remarkable success in the discovery of Tin at Mount Bischoff.”

The Rev. J. Wilkes Simmons and Mr. C. J. Atkins, who had previously been nominated by the Council, were balloted for, and declared duly elected as Fellows of the Society.

The Hon. Secretary, Mr. Barnard, brought forward the usual returns for the past month :—

1. Number of Visitors to Museum :—On Sundays, 437 ; on week days, 775 ; total, 1,212.
2. Ditto to Gardens :—Total, 4,470.
3. Plants, etc., received at Gardens :—From Mr. J. B. Walker, plant of *Anthocoris Tasmanicus*. From Botanic Gardens, Melbourne, 53 plants. From Baron von Mueller, bulbs of a species of *Crinum* ; seeds of *Macrozamea Moorei*. From Mr. G. Brunning, Melbourne, 43 Roses. From Mr. J. Latham, 30 Roses. From Miss Solly, 5 packets seeds. From Messrs Shepherd, Sydney, 45 plants and 24 new varieties of *Gladiolus*. From Mr. C. F. Creswell, Melbourne, 10 plants.
4. Seeds sent from Gardens :—To Mr. S. Purchase, Parramatta, 50 packets ; to Messrs Shepherd and Co., Sydney, 50 ditto.
5. Periodicals received.
6. Presentations to Library.
- 7 Ditto to Museum.

Meteorological Returns :—

1. From Marine Board, Tables from Goose and Swan Islands for June.
2. From the Government Astronomer, Melbourne, Record of Meteorological Observations for Nov. and Dec., 1880.
3. From Dr. Hector, Meteorological Observations taken in New Zealand during the quarter ended March 31 ; Observations taken at Wellington from February to June, 1881.

Time of leafing, flowering, and fruiting of a few Standard Plants in the Botanical Gardens during July :—

- 9th. First Snowdrop, in flower.
- 12th. *Cytisus leucanthus*, commencing to flower.
- 15th. *Arbutus unedo*, ditto.
- 18th. *Garrya elliptica*, ditto.
- 25th. Yellow Crocus, ditto.
- 31st. White Mulberry, buds bursting.
- 31st. White Hyacinth, commencing to flower.
- 31st. Almond, ditto.

The Secretary also presented a long list of valuable donations received during the month, which we are compelled to omit owing to want of space.

The Chairman, alluding to the presentations to the Library, drew the special attention of members to the number and value of the books and publications which had been received from various institutions of America, in exchange for the Transactions of the Society.

The Chairman read a short paper on the question of establishing in the Society's Gardens a "Class Ground," or systematic arrangement to illustrate the classification of plants according to their Natural Orders; with a communication from Dr. Agnew on the subject, and a letter from Dr. Schomburgk, of the Botanic Gardens, Adelaide.

A lengthened discussion followed the reading of this paper, in which most of the Fellows present took part, eliciting many different views of the proposal; and it was ultimately determined to resume the consideration of the subject at the next evening meeting of the Society.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held an ordinary meeting on Thursday, 25th August. The President, Dr. Ralph, occupied the chair, and there was a fair attendance of members. In the absence of Mr. Barnard through illness, the reading of his paper on "the Minute Structure of our Cereal Grains" was postponed. Mr. W. W. Allen exhibited Nachet's 1-14 immersion lense, successfully resolving several difficult test objects, principally *Diatoms*. A very agreeable evening was spent.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The Field Naturalists' Club of Victoria August Meeting was held on Monday evening, the 8th, at the Royal Society's Hall, where future meetings will be held, and where it is requested all communications may be addressed. There was the usual good attendance of members, and Mr. T. A. F. Leith occupied the Chair. Mr. J. H. Mathias was duly elected a member, and ten additional nominations were received.

The papers read comprised—1. "On the Black-fish," by Mr. F. J. Williams, giving many interesting particulars of its habits, describing the original method of capturing it adopted by the natives, and accounting for its rapid disappearance from our streams by the introduction of the Cod. 2. "A few notes on *Nipa fruticans*," by Baron F. von Mueller, being an interesting account of the recent discovery of this palm-like plant on the Herbert and Daintree Rivers in Northern Queensland. 3. "A Census of the Grampian Plants," by Mr. D. Sullivan, of the State School, Moyston. In a short preface the writer expressed his conviction that the number of plants incidental to the locality would probably exceed 1,000, of which he himself possessed about 700. The census itself is very carefully compiled, and would doubtless be very useful to collectors in other parts of the country. 4. "On a rare species of Live Shell recently found at Portland," by

Mr. J. F. Bailey. This shell, recognised by the writer and others as *Limopsis Belcheri*, has never previously been taken alive, except three specimens by Admiral Belcher in 1842, off the Cape of Good Hope, at a depth of 140 fathoms.

The ophthalmoscopic demonstration of the eye of a rabbit, by Dr. S. Bernays, was very interesting. Dr. Bernays succeeded in showing and explaining the peculiar appearances of the nerves and coloring of the eyes of the white rabbit he had brought with him.

Of the exhibits, mention may be made of the female Gang-gang cockatoo shown by Dr. Lucas, who gave a few particulars of the locality of the bird; of two fine species of Coleoptera, viz: *Neo-lamprina*, sp. and *Bactocera* sp.; also ripe fruit of *Nipa fruticans* from Northern Queensland, by Mr. C. French; of a collection of Queensland Lepidoptera, by Mr. T. A. F. Leith; and of some fossils from Mordialloc and the Botanic Garden, by Mr. J. E. Dixon.

At the next meeting Mr. Leith will read a paper on the Hairless Blacks of Queensland, and there will also be one by Mr. Thos. G. Sloane on the *Carenums* of Mulwala, New South Wales.

LECTURES.

THE STORY OF THE EARTH,

AS REVEALED IN THE ROCKS.

Mr. Denton continued his course of lectures on "The Story of the Earth," delivering the fourth on Monday, August 1st, the large hall of the Athenæum being crowded. The subject was the "Age of Reptiles." The fossil remains of this period consisted in a great measure of foot-prints left by reptiles on the sandy beaches. Of these Professor Hitchcock had described about 120, including lizards, frogs, tortoises, and several others, all being of huge proportions, the largest being apparently that of a frog-like animal, the imprint of whose foot measured 22 inches in length by 15 inches in width. The lecturer then described several reptiles peculiar to this period, and indicated that a careful study of their remains went to prove the doctrine of evolution, particularly in the case of birds, which now began to appear, these being at first four-footed, then gradually assuming an erect posture, wings being developed from the disused forefeet. In concluding the lecture, Mr. Denton urged upon all those who had the care and instruction of the young, the importance of natural science as a means of instruction, affording easy methods of developing the reasoning powers. After the conclusion of the lecture a fine series of photographs, illustrating the subject of the lecture, were shown by means of the oxy-hydrogen light.

The fifth lecture was delivered on Wednesday, August 3rd, the subject being "The Age of Mammals and the Dawn of Man." The tertiary period was also called the "Age of Mammals," as, although mammalian animals had made their appearance in earlier periods, it was not until the tertiary that they attained their full development. Scientists had divided the class Mammalia into twelve Orders, and these were further sub-divided into families, genera, species, and varieties;

the lines of distinction, however, were purely artificial. The tertiary periods had been divided into three, the eocene, miocene, and pliocene. Copious descriptions were given of the forms of life peculiar to these divisions. Although nearly the whole of the twelve orders of animals were represented by fossils in the eocene deposits, it was not until the pliocene, or more recent formation, that man appeared, the earliest known skeleton of a human being having lately been discovered in pliocene rocks in California. During the tertiary period many changes had taken place in the form of the Earth's surface; the temperature had also gradually fallen, and the Earth prepared for the advent of man. Almost all the species of animals existing in the tertiary period were now extinct, although succeeded by other closely allied forms. And now perfection of form had been arrived at in man, who alone would witness the further development of the planet. Many beautiful illustrations were shown of the various forms of life during this period of the world's history.

The sixth and concluding lecture was delivered on Thursday, August 4th, at the Athenaeum. The attendance was very large, the hall being crowded to excess. The subject of the lecture was "The Future of this Planet and of its Inhabitants." The lecturer enlarged upon the theme that the disposition to look into futurity had existed ever since man appeared, and that it seemed to be inseparable from human nature. Mr. Denton then went on to give his own views with regard to the future of the planet. After the conclusion of the lecture a fine series of pictorial illustrations were shown by means of the oxy-hydrogen light, applause was frequent, and the large audience departed seemingly much pleased with the entertainment.

Mr. Wm. Denton delivered the first lecture of his second course on Monday August, 10th, and, as usual, there was a large and appreciative audience, the subject being "Man in the Stone Age, or the Infancy of the Human Race." The lecturer described the gradual formation of language, and then went on to describe the implements and weapons used by man at various periods. The Age of Iron was described, then the Age of Bronze, and beyond this the Stone Age. The latter had been divided into the new stone age and the old stone age. During the former the use of domestic animals had been proved by many kinds of evidence, but in the old stone age there was nothing but wild animals.

The second lecture was descriptive of "Ancient Egypt," in which Mr. Denton explained the Pyramids as mortuary monuments. The very high state of civilisation that obtained amongst the ancient Egyptians was fully described, and extracts from some of their writings given to show their reverence for moral laws. The pictorial illustrations at the conclusion of the lecture were very beautiful, and were warmly applauded.

The third and concluding lecture of the second series was delivered on August 11th, when Mr. Denton took for his theme "The Future of our Planet." Reasoning on the countless ages of the past, he maintained that countless ages would elapse before this world came to an end. Volcanoes and Earthquakes would cease, wild beasts would cease to be, and all noxious weeds would vanish. The climate would

be improved, electricity would be the great motive power, and population would increase largely, while agriculture will have so improved that one acre would be made to produce food to an extent far beyond our wildest dreams. There will be no waste, and man will have more brain, will put down all brutish thoughts, and nourish only that which is great and good: none will be idle, and all will be happy. The lecturer concluded amidst enthusiastic cheers.

NOTES, MEMORANDA, &c.

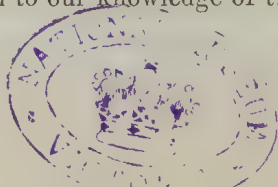
Nicholson's Manual of Zoology.—We have received the sixth edition of this valuable manual, which has been revised and brought into accordance with the present state of scientific knowledge. Few changes of importance have been requisite on the present occasion, as the work was almost entirely re-written for the fifth edition, which was published in 1878, when many important additions and alterations were made, embodying the results of the recent researches of Mosely, Owen, Marsh, Wyville Thompson, and others. The only noticeable change in classification in the present edition is the admittance of the Echinodermata as a distinct sub-kingdom, the Scolecida being relegated to the Annulosa. It would, perhaps, have been more convenient if the author had brought his classification into closer accordance with the system now usually adopted by admitting the sub-kingdom Vermes for the Scolecida and Anarthropoda. The bibliographies have been brought down to the present time, and many new illustrations have been added, which the author hopes will serve to lighten proportionately the labor of the student. Professor Nicholson's "Manual" is still without a rival in its own sphere of usefulness, and its study may be considered an absolute necessity for any student who wishes to obtain a general insight into the science of Zoology.

We welcome with pleasure the successful establishment of a Science Society, in connection with the Bendigo School of Mines, at Sandhurst. The Society has for its object the study of Natural and Physical Science. The ordinary meetings are to be held on the third Monday in each month for the reading of papers, exhibition of specimens, and general business; and the member's subscription has been fixed at the modest sum of five shillings per annum, which ought to induce young men to join freely, especially, as the office-holders and members of committee are mostly gentlemen of acknowledged ability. The list of original members contains upwards of seventy names, several being well known in the world of science, so that we have every reason to expect the young men of Sandhurst, who join the society, will obtain substantial benefit from the assistance and advice of older scientists. The inaugural address delivered at the opening meeting, June 20th, 1881, by the President, Dr. P. H. Macgillivray, M.A., F.L.S., is so universally interesting that we have much pleasure in giving it to our readers in full on page 153, and we hope to have many reports of useful work by the members of the Society.

Contributions to the Flora of Queensland is the title of a very interesting and valuable addition to the scientific publications of Australia, by P. A. O'Shanessy. Those who are acquainted with the *Flora Australiensis* of Benth and Müeller will remember seeing the name of Mr. O'Shanessy as the collector of a very large proportion of the Queensland plants. He has been known as a botanist in central Queensland for many years. In the little book referred to he gives the result of his observations, which are economic and useful rather than technical. Readers will be surprised to find the number of curious facts which are here described as to the properties of bush trees and plants. They will learn also that there are a large number of edible fruits in the Queensland scrubs, besides the materials for dyes and drugs, which are of a most varied and interesting character. Mr. O'Shanessy has been a very close observer, and his book should be in the hands of every one interested in Australian botany. In common with most colonial authors, he has to deplore the extent to which his work has suffered through printer's errors. We find also a considerable variation from the nomenclature of the "Flora," but a reference to the index of the latter work will easily show the species meant.

We have been favored with a card showing the engagements of the Dunedin Naturalists' Field Club for the coming Spring, and are glad to find that the excursions are numerous and varied: there are ten announced extending over three months, and we hope to have good accounts of work done on these field days, there being many interesting spots in the vicinity of Dunedin which ought to yield good results. There has been some delay in starting this Club, but now it seems to have entered vigorously on a career of usefulness that we are sure will be productive of much enjoyment for the members. Full reports of the meetings and excursions will be anxiously looked for by kindred societies here and elsewhere.

We have received a copy of a paper on New Zealand Crustacea, by G. M. Thompson, F.L.S., read before the Otago Institute, 11th May, 1880, being notes and descriptions of new species to supplement papers by the same Author, included in the transactions of the Institute for 1878. The present paper comprises descriptions of some 20 species, most of which were originally communicated by the author to the *Ann. and Mag. Nat. Hist.* at various times, but now brought together and made more fully interesting by the addition of copious notes of observations made during the last two years on a large number of specimens, by which doubtful points have been explained and fresh light thrown upon others. The species described in this paper are in the sub-divisions *Schizopoda*, *Isopoda*, *Amphipoda*, and *Phyllopora*. Two plates of carefully drawn figures are added, and the whole seems to be a most useful addition to our knowledge of the subject.



THE
SOUTHERN SCIENCE RECORD

MELBOURNE, OCTOBER, 1881.

ON THE OCCURRENCE OF *NIPA FRUTICANS* IN NORTH QUEENSLAND.

BY BARON VON MUELLER, K.C.M.G., Ph. & M.D., F.R.S.

[Read before the Field Naturalists' Club of Victoria 13th June, 1881.]

In February of this year Mr. F. M. Bailey announced in the *Brisbane Courier* that a *Nipa* was discovered by Mr. Arthur Neame on the Herbert River, and that he was inclined to consider it distinct from the only species of the genus known to extend from New Guinea to Insular and Continental India, South China, and the Philippine Islands, and he expressed simultaneously a desire to name it in honor of its finder.

The information of *Nipa fruticans* extending to North-East Australia did not come altogether unexpectedly; but the discovery of a new species in so grand a genus would have been of more than ordinary interest. To settle this question I asked Mr. Bailey to afford me the loan of the dried specimens received by him, and to this request he most readily acceded. Having gone through the rather wide literature of this remarkable plant, from the time of Camell and Ray to the present day, I have come to the conclusion that the Queensland *Nipa* in no way differs from the true original species, though I had to clear up some obscurity of characteristics which had been imperfectly given, and whereby any one might be led to assume that really a second congeneric form did exist. This subject becomes now especially interesting to the Field Naturalists' Club, as one of its leading members, Mr. Chas. French, has recently also obtained a ripe *Nipa* from the Daintree River. It is unnecessary to refer here anew to the peculiar stemless habit of this palm-like plant, or amazing size of its leaves, which attain the almost incomparably unique length of thirty feet, or to repeat to what use the sap and leaves are turned in some countries, as accounts of the *Nipa*-palm occur in all scientific encyclopædias, and also in many popular works on plants. But I may here observe that I do not share the views of Blume and Griffith, who transferred *Nipa* from the *Pandaneæ* to the *Palmaceæ*: for although the leaves are palm-like, the structure of the inflorescence, and particularly the almost strobilar nature of the fruit, irrespective of the rhizomatous creeping lower portion of the caudex, point far more to the order of the screw-pines than to that of the palms. It is pleasing that so magnificent a form of the vegetable world can now also be called a member of the Australian flora, and be adduced as a new connecting link with that of South Asia, and indeed, in this instance, even with the tertiary vegetation which in tropical grandeur clothed the shores of Britain prior to the glacier-epoch.

FAMILIES OF COLEOPTERA, OR BEETLES.

By W. H. WOOSTER.

[Member of the Microscopical Society of Victoria.]

PART IV.

PTINIDÆ.—*Shape*, oval or subcylindric; mostly firm. *Head*, covered by thorax, generally invisible from above, and deep-set in thorax. *Antennæ*, 11 or 9-jointed, filiform, serrated, pectinated, or short, with 3-jointed club. *Tibial spurs*, small or none. *Feet*, 5-jointed, first 2 joints subequal. *Abdomen*, 5-jointed, first longest. *Palpi*, short, last joint thickish. *Size*, 1-10th to $\frac{1}{4}$ in. *Color*, dull, some spotted. Found in timber of all kinds; they often riddle posts, rafters, &c., with small round holes. Some infest insect collections, &c., doing great damage in the larva state. Eight Australian species are catalogued. Only one is given as Victorian, but I have taken the Queensland species and one of the Tasmanian ones in Victoria.

BOSTRICHIDÆ.—*Shape*, cylindric; firm. *Head*, generally covered by thorax. *Wing-cases*, often obliquely truncate behind. *Antennæ*, 11 to 9-jointed, with club of 3 joints inserted at front edge of eyes. *Tibial spurs*, large, at least on fore shanks. *Feet*, 5-jointed, 1st joint very small, 2nd and 5th large. *Abdomen*, of 5 joints. *Length*, $\frac{1}{8}$ to $\frac{3}{4}$ in. *Colors*, dark or dull. Found on trees or in timber, which they bore like the Ptinidæ. Masters gives 7 species. None are credited to Victoria, but I have taken 3 or 4 species.

CISSIDÆ.—*Shape*, oblong or oval. *Head*, mostly very short, covered or nearly so by thorax. *Antennæ*, of 11 to 8 joints, inserted at front edge of eyes; club of 3, seldom 2 (*Lyctus*) joints; back and sides of thorax separated by sharp ridges. *No tibial spurs*. *Feet*, 4 jointed, seldom 5-jointed; 1st very small, hardly distinct; last long. *Abdomen*, of 5 segments. *Size*, not over $\frac{1}{4}$ in. Found in fungi on trees. These form but a small family. Found chiefly in Europe and America, and do not appear to have been yet taken in Australia.

TENEBRIONIDÆ.—*Shape*, oblong, oval or rounded, thick or depressed, generally firm. *Jaws*, short, stout, curved externally, emarginate within, with large molar tooth at base. *Eyes*, mostly large, transverse, emarginate or sinuate in front. *Antennæ*, 11, seldom 10 jointed; inserted in front of eyes, under lateral ridge of head; 3rd joint generally longest, last joint of palpi generally securiform. *Hind feet*, 4-jointed; the rest 5-jointed. This is the typical heteromerous foot. *Claws*, simple. *Abdomen*, of 5 segments, 4th shortest. *Wings*, often absent. *Size*, $\frac{1}{4}$ to lin. or over. *Colors*, mostly black or dull. Found under logs, stones, bark, &c., in damp, dark places. They are vegetable feeders, often eating dead stuff, but some attack flour, bran, &c. Many emit a fetid fluid when touched; and some shoot out a pair of temporary flexible tails when disturbed, covered with an acrid slime. Many are mistaken for Carabidæ in appearance. This is a numerous family, over 400 species being set down to Australia.

CISTELIDÆ.—*Shape*, oval to linear; rather firm. *Mentum* or *chin*, on a peduncle of submentum. *Lower jaws*, not covered. *Eyes*

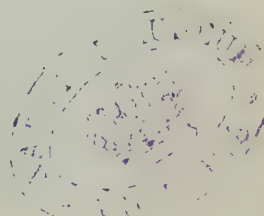
lateral, generally emarginate, occasionally very large and nearly meeting in front. *Antennæ*, 11-jointed, uncovered at base, or under small ear-shaped orbits. *Feet*, like *Tenebrios*. *Claws*, denticulated. *Abdomen*, of 5 or 6 segments. *Length*, $\frac{1}{4}$ to $\frac{3}{4}$ in. *Color*, mostly dark or dull. Found on flowers, hedges, &c., under bark, &c. *Larva*, often in rotten trees. Masters gives over 60 species, but only 4 as Victorian, though there are several.

MONOMMIDÆ.—*Mentum*, on peduncle of submentum. *Head*, short, deep in thorax. *Eyes*, transverse, meet below; facets large. *Antennæ*, inserted just before the eyes, under lateral ridge of head, received at rest in a curved channel on sides of thorax; of 11 joints, last 3 forming an oval depressed club. *Thorax*, as wide as elytra at base, its top and sides distinct. *Elytra*, elliptic-ovate, with narrow horizontal margin. *Legs*, contractile. No *tibial spurs*. *Feet*, slender, filiform, heteromorous. *Claws*, simple. *Abdomen*, of 5 segments. These are small beetles, forming 2 genera, as yet only found in Madagascar and the United States.

NILIONIDÆ.—*Shape*, hemispheric. *Head*, vertical, deep in thorax, rests in repose on fore coxæ. *Eyes*, transverse. *Antennæ*, of 11 joints, not covered at base. *Prothorax*, fits in a lunate emargination of elytra. *Legs*, short. *Feet*, filiform, heteromorous, last joint but one emarginate. *Claws*, simple. *Abdomen*, of 5 segments. This family includes but one genus, *Nilio*, found from Mexico to Brazil.

PYTHIDÆ.—*Thorax* much narrower than elytra. *Head*, prominent, not necked, horizontal or nearly (except *Agnathus*). *Eyes*, lateral, entire. *Antennæ*, 11-jointed, not covered at base, gradually thicker to tip, or with small club. *Legs*, short. *Feet*, filiform, heteromorous, last joint but one entire. *Claws*, simple. *Abdomen*, 5 jointed. These are small, some bright, found on flowers, under bark, &c. The proboscis of some reminds one of the *Curculios*. Masters names but one species of Tasmania, but I have taken some Victorian specimens.

MELANDRYIDÆ.—*Shape*, elongated, cylindric, or depressed; firm. *Head*, not necked, sloping. *Maxillary palpi*, mostly long, stout, pendant, serrate, last joint large, cultriform or securiform. *Eyes*, emarginate (except *Abdera*). *Antennæ*, 11, seldom 10-jointed, generally filiform, or thickened at end. *Thorax*, as wide as base of elytra. *Feet*, heteromorous, the penultimate joint sub-bilobed. *Abdomen*, of 5 segments. *Length*, $\frac{1}{4}$ to $\frac{1}{2}$ in. *Colors*, dull. Found under bark, on shrubs, &c. But one species appears in the catalogue, and that from Queensland. There are at least 2 species in Victoria.



NOTES ON THE LEPIDOPTERA OF JAPAN.

By F. C. CHRISTY.

[Read before the Field Naturalists' Club of Victoria 13th June, 1881.]

PART II.

Passing from the Papilionidæ to the Phingidæ, the latter family is very extensive in Japan, but unfortunately few were named when I left.

SMERINTHUS—

ocellatus—is, I consider, identical, the larvæ feeding upon the apple.

populi—I believe is also there, as I took larvæ on the poplar resembling it.

tillia—Is closely represented, but apparently not identical. A fine insect closely allied to smerinthus found.

ACHERONTIA—

atropos—I consider identical with the European "Death's Head," but it has been named "Styx."

SPHINX—

convolvuli*.

ligustri—I took the larvæ upon the indigenous privet, but did not succeed in maturing it; the larvæ differed only in the slightly lesser intensity of the violet stripes.

pinastri—I believe to be identical with the European species. There are three other grand insects I took in this genus, one with buff underwings, another very large grey with darker markings, and one smaller with buff underwings.

deiphila—This genus I did not find, but doubtless it exists, as the *euphorbia*, *galium*, and wild madder grow in abundance.

CHÆROCAMPA—elpenor*

Two other species closely allied to *celerio*, but differing materially. I took also other species of larvæ.

MACROGLOSSA—

stellatarum*.—(Humming bird Hawk-moths.) Three other lovely species I also took.

SESIA—Four species of "clear wings," very grand and beautiful, were taken by me: one I observed closely resembles a Queensland species shown at the Melbourne Exhibition.

trochilidæ—(smaller "clear wings.")

SHECIA—One or two fine species, the larvæ feeding up the pith of the wild grape-vine; they are easily obtained in winter in the woods: by observing the vine where the stem is distorted or swollen, the pupa is inside: this piece cut off and placed in the breeding cage will produce the perfect insect in the beginning of Summer.

TROCHILUM—Four or five species not identified as European species : one I took at "Kobe" about the size of a small gnat a beautifully delicate insect. All the species taken were banded with gold, not any with red, as in some of the British species.

ANTHROCERA—(The Burnet)—Two species differing from the British.

HEPIALIDÆ—(Swifts).—Some half-dozen species, but not identical with those of Europe.

COSSUS—Doubtless existing, as the country abounds with willows, but not taken by me.

BOMBYCIDÆ—This genus is most largely represented. There are the large silk producing species (*Yamamai*) larvæ feeding upon the Oak, another upon the Ailanthus and one beautiful species I took with transparent membranes or lunules in the wings, also the large sea green species, a grand insect, *Bombyx mori* (the mulberry silk worm raised domestically), and one species closely resembling it, in the wild state.

CLISICCAMPA NEUSTRIA*—(The lackey).

CLISIOCAMPA ODONESTRIS—(The drinker)—Differing from the European species, and several smaller species.

LASIOCAMPA—Two or three species differing from the European.

DENDROLINUS PINI—(pine lappet)—Very abundant, but larger than the European species.

GASTROPACHA QUERCIFOLIA—(The Oak lappet)—I believe to be identical with the British species; larvæ and imago are similar.

STAUROPIUS FAGI*—(The lobster).

HAMMATOPHORA—(Differs from the European species).

CLOSTERA CURTULA*—(The chocolate tip). And several other species.

NOTODONTA—(Prominents). Numerous species.

LOTHOPTERY— Ditto. Ditto.

CERURA VINULA*—(The puss moth)—Several others probably identical with *furcula*, *latifascia*, &c.—(the kittens),—as the larvæ were taken upon the willows and aspen (*populus tremulus*).

ENDROMIS VERSICOLOR—(The Kentish glory). Was, I believe, taken by Mr. Pryer.

FUMEA—Several species in this family.

NUDURIA—Ditto ditto.

PORTHETRIA DISPAR*—(The gipsy).

PSILURA MONACHA*—(The black arches).

DASYCHIRA—

STILPNOTIA SACLICIS*—(The satin moth).

PORTHESIA AURIFLUA*—(The brown tail moth).

PORTHESIA CHRYSORRHÆA*—(The gold tail moth).

SPILOSOMA MENTHAESTRI*—(The large ermine).

SPILOSOMA LUBRICEPEDA*—(The spotted buff ermine).

A FEW NOTES ON A SHELL FOUND LIVING AT PORTLAND

(Previously known only as fossil in Victoria).

By J. F. BAILEY.

[Read before the Field Naturalists' Club of Victoria 8th August, 1880]

Limopsis Belcheri.—(ADAMS & REEVE).

Genus—*Pectunculina*—(D. Orbigny). Sub-genus—*Limopsis*—(Sassy, 1827). Species—*Belcheri*—(Adams & Reeve). Description—*Testa oblique, ovata, depressa, decussatum striata, latere antico brevi, postici multo longiore, dilatato, epidermide fusco, dense pilosa, pilis in sinuibus concentricis, despositis.* [This shell is remarkable for an epidermis of fringes.—ADAMS & REEVE: "Zoology of the voyage of the 'Samarang.'" Plate XXII, fig. 5.]

In the year 1842 a shell was dredged off the Cape of Good Hope from a depth of 140 fathoms of water by the expedition under Admiral Belcher, and named in the Zoology of the voyage *Limopsis Belcheri*: since that time no other specimens have been obtained. The genus to which the species under consideration belongs dates back to the oolitic period, in which it first appears as *Limopsis oolitica*, three species being found in that formation. In the cretaceous, the next period, the Eocene or older Tertiary, the genus obtained its maximum development, 27 species being found fossil in this formation. With the exception of *Limopsis aurita*, dredged living by the Challenger expedition at great depths from Arctic to Antarctic seas, and fossil of the Crag of England, Eocene and Miocene of Victoria *Limopsis pygma* found living on the coast of Finmark and fossil of the Pliocene of England, Belgium, and Sicily, *Limopsis Belcheri* found living in South Africa in deep water and washed up on the beach at Portland, Victoria, no other fossil species of this genus has been found living. The description of *Limopsis Belcheri* in the Zoology of the voyage of the "Samarang" is so brief that it is scarcely possible to recognise the shell, especially the fossil, from that description, as it represents the shell as being covered with concentric fringes, or horny *periostraca*, which quite conceal the characteristic sculpturing. According to Professor McCoy no other specimens than those obtained by Admiral Belcher have been found, and it would be almost impossible for any geologist to have recognised the fact of one of the few living species so abundant in our rocks not to be an inhabitant of Victoria, but of South African deep waters, from the very meagre description given by Adams and Reeve. Our national museum having fortunately obtained a recent specimen, I have compared our fossil examples, and find them identical with the recent species obtained at Portland, and also from the very accurate description given by Professor McCoy in the *Palæontology of Victoria*—Decade, II, Plate 19, fig. 8-9.

The discovery of this species in Victorian waters is most interesting as to the perpetuation of species in time, showing that this species, as with others, has a very wide range extending through all our tertiary formation, so extremely plentiful, especially so in the older tertiary

period, and now a shell of so rare occurrence that the only specimens known are those dredged by the "Samarang" expedition in 1842 and the one under consideration, found in January 1881. The finding of this shell on the spot where it is fossil in such numbers goes to prove that the greatest care should be exercised to ascertain whether a species is extinct before declaring it as such. This is the only species of the genus found living in Victoria. Only two species of the genus are found fossil.

RECORD OF SOME ORCHIDÆ FROM THE SAMOAN ISLANDS.

BY BARON FERD. VON MUELLER, K.C.M.G., M.D., Ph. D., F.R.S

Already several years ago the Rev. S. Whitmee and the Rev. T. Powell contributed to my museum-collections many plants from the Navigators or Samoan Islands; to this material have recently been added species in considerable number gathered there, particularly in the mountain-regions, by Mr. Ernst Betcher, so that now sufficient material has accumulated for obtaining a fair idea of the whole flora of these islands, hitherto only the ferns and mosses having been elaborated in England connectedly, though the late Dr. Berthold Seemann and Dr. Asa Gray rendered known also some Samoan plants long ago. Being interested in the Polynesian flora, especially through studies of allied plants of intra-tropical Australia, and having given some attention already to the vegetation of New Guinea, New Caledonia and the New Hebrides, I have resolved to draw methodically now the Samoan Flora also into the range of my observations, and as a first instalment of these researches I offer the results of my investigations of the orchids from thence, to which class of plants Mr. Betcher devoted during two years' rambles in the Samoan group particular attention. The Orchids recorded already from Samoa seem only *Ramphidia rubicunda*, *Agrostophyllum megalurum* (doubtful as to genus) *Sarcochilus Graeffei*, *Appendicula bracteosa*, *Phajus Graeffei*, *Eria myosurus* and *Oberonia glandulosa*, all with one exception sent by me from Dr. Graeffe's collection to Dr. Seemann, and thus described by Professor G. Reichenbach, the successor to Lindley as a leader in Orchidology. More latterly the same experienced orchidographer has, so far as I am aware, added to these *Dendrobium dactyloides*, *Etæria Whitmeei* and *Platylepis heteromorpha*, which latter Bentham is inclined to transfer to *Mærenhoutia*.

Corysanthes Betchei.—Leaf sessile, cordate-orbicular, very slightly pointed, green beneath; bract linear, acuminate; inner as well as lower sepals at least half as long as the upper sepal, or attaining to two-thirds of its length; the latter by compression almost dimidiate-ovate, rather boat-shaped than helmet-shaped, not horned; labellum broad, recurved towards the summit, roundish in front, short-fringed-toothed along its upper margin, gradually narrowed downward, smooth on the surface, and bearing at the base two short bluntish spurs; column very short; fruit nearly sessile.

On bushy mountains of Upolu, at an elevation of about 1,000 feet, only once found.—BETCHE.

This—the first species of *Corysanthes* received from Polynesia,—differs from *C. Cheesemani* (J. Hook. icon. plant, 1120) in its narrower bract and in its distinctly denticulated and differently shaped lip; it approaches systematically also *C. bicalcarata*, but the leaves are not purple-colored on the lower page, and the lip is not toothless; it comes in habit nearest to *C. fimbriata* and *C. pruinosa*, but the conspicuously developed conical spurs mark it at once as different, while from all these congeners it is additionally distinguished by the elongation of the four narrow of its sepals. The latter characteristic is however not so strongly expressed as in the section *Nematoceras*, to which all species of New Zealand except *C. Cheesemani* and also those from Java belong. *C. callosa*, published as Australian by Blume (fl. Jav. iv, 175, pl. 63, fig. 3), belongs either to *C. fimbriata* or *C. pruinosa*.

In specimens of *C. macrantha* from the Chatham-Islands I notice a short bristly appendage, originating opposite to the bract, indicative of a rudimentary pedicel, as occurring likewise in the sections *Lep-toceras* and *Adenochilus* of *Caladenia*.

Among about 30 orchideæ, described by Dr. G. Reichenbach as peculiar to New Caledonia, the Australian genera *Acianthus*, *Caladenia* and *Prasophyllum* are represented, but neither *Corysanthes* nor *Cryptostylis*.

Cryptostylis alismifolia.—Leaves on long stalks, ovate, conspicuously acuminate; flowers 3-5, rather distant; inner sepals about half as long as the outer; labellum nearly glabrous, narrowly semi-lanceolar, acute, amply dilated at the base, longitudinally streaked by five equidistant lines and towards the summit spotted, upwards along the margin inflexed, not appendiculated; anther slightly acuminate.

In springy ravines of the mountains of Apia, at an elevation of about 3,000 feet, rare.—E. BETCHE.

In affinity this—the first species from Polynesia—stands nearest to *C. ovata*, from which it differs (so far as the scanty material admits of comparison) in often shorter and comparatively broader leaves, with larger and hence less numerous areoles, in smaller flowers, in the labellum neither suddenly dilated above the middle, nor provided towards the summit with a callous protuberance. As regards size and shape of flowers, the Samoan plant resembles more *C. arachnites*, but the leaves are rounded at the base, the flowers are less numerous and less crowded, and the lip is not distinctly velvet-downy, nor does Blume's description and drawing (fl. Jav. iv, 133, planch. 45, fig. 2) indicate any conspicuous streaks of the lip in *C. arachnites*. From *C. Zeilanica* Mr. Betehe's plant is readily separated by its lip, much widened at the base and not narrowly attenuated from the middle downwards. Leaves and flowers of the Samoan species are similar to those of *Chlorosa latifolia*, which plant would be referable to *Cryptostylis* also should the pollen perhaps have been described disintegrated from a very aged anther, even though the basal labellum-pouch, characteristic for the genus *Cryptostylis*, should really be absent,

Zosterostylis thus far forming the transit. The pollen-masses of *C. alismifolia* are quite normal. Mr. Betche notes the sepals greenish and the labellum brownish.

The upper dilatation of the lip is much more noticeable in *C. ovata* than in *C. longifolia*, and its areolation reminds of that of the leaves.

Bulbophyllum Betchei.—Rhizome creeping; vaginating scales obliquely truncated and slightly pointed; leaves small, lanceolar, or narrow-oblong, flat, streaked by longitudinal nerves; flowers very small, solitary, on very short and thin stalks; lower sepals semilanceolar, extended into hardly any spurlike or saccate prolongation; upper sepal lanceolar, as long as the lateral sepals, all three pale, and each marked with three purple streaks and a purple margin; inner sepals oval, of about $\frac{1}{3}$ the length of the others, 1-nerved; labellum half as long as the outer sepals, thick, tongue-like-oblong, above its base slightly membranous, dilated and callous in the centre of the dilatation, channeled in its lower portion; adnate portion of the column exceedingly short, the free portion terminated on both sides by a linear awl-shaped conspicuous tooth; pollinia roundish, egg-shaped, each consisting of two masses of equal length.

Epiphytal on trees in the lower mountain-region of Apia.—BETCHE.

Leaves 1-1 $\frac{1}{2}$ inch long, $\frac{1}{8}$ - $\frac{1}{2}$ inch broad; joint below the leaves very short, not forming a regular pseudobulb. Flower about $\frac{1}{4}$ inch long. Fruit egg-shaped, nearly $\frac{1}{2}$ an inch long. In its systematic alliance this Samoan species stands nearest to the East Australian *B. aurantiacum*. I avail myself of so apt an opportunity to characterise an North East Australian congener from the same group of small-flowered species.

Bulbophyllum Prenticei.—Rhizome creeping, its scales soon broke up into cilia; leaves ellipsoid-or narrow-cylindrical, blunt, slightly channeled, nerveless, faintly wrinkled from foveolar dots; flowers very small, on very short and thin stalks: lower sepals oblique deltoid-semilanceolar; extended into a semiovate basal prolongation; upper sepal lanceolar; inner sepals narrow-lanceolar; all nearly of equal height; labellum as long as the sepals, yellow, thick, oblong, cuneate at the base, lobeless; free part of the column very short, terminated on each side in a deltoid tooth; capsule small, oblique-obovate, attenuated at the base.

In the Bellenden Ker's Ranges, at an elevation of 3-4000 feet.—KARSTEN.

Leaves 1-1 $\frac{1}{2}$ inch long, about $\frac{1}{4}$ inch thick. Joint below the leaf very short, not forming a regular pseudobulb. Flowers probably produced singly (only seen detached), about $\frac{1}{3}$ inch long; sepals pale, towards the base pink, the outer 5-nerved, the inner 1-nerved. Fruit about $\frac{1}{3}$ inch long.

Dedicated to Dr. Prentice of Brisbane, well-known as an able investigator of ferns and as a promotor of Australian Botany generally.

In conformity with usage I have adopted the term sepals for what really are segments of the calyx-limb.

Taeniophyllum Fasciola, G. REICHENBACH in Seemann's *Flora Vitiensis*, 226; *Epidendron Fasciola*, G. FORSTER, florul. ins. Austr. prodr. 60.

Stemless; roots leaf-like, flat, flexuous, one-nerved, fascicled; peduncles very short, with one or two flowers; calyx slightly scabrous outside, pale yellowish; limb minute, cleft to at least $\frac{2}{3}$ of its length; lower lobes broadly semilanceolate; upper lobe cymbiform-lanceolar; inner lobes not much shorter than the three outer, narrow-lanceolar; labellum membranous, semicymbeous-triangular, incurved-apiculate; about as long as the two inner lobes, and protracted into a deltoid-semiovate spur of fully half its length; column very short; each pair of pollen-masses pearshaped-globular, consisting of two parts of equal length.

On Breadfruit-trees in the coast-track of Upolu.—BETCHE.

Root-like leaves attaining the length of 5 inches, but scarcely more than $\frac{1}{8}$ inch in width, so far as now seen. Flower-stalks about $\frac{1}{2}$ inch long, with overlapping bracts at the base, and several alternate very short but acute bracts towards the summit. Flowers noted as white by the collector. Outer lobes nearly $\frac{1}{8}$ inch long. Fruit measuring about one inch in length, and $\frac{1}{4}$ - $\frac{1}{5}$ of an inch in thickness, placed on a very short stalklet. Seeds raphidoid, pale-yellowish.

This may be fairly assumed to be identical with Forster's plant from the Society-Islands, although that has never been fully described.

By a slight modification of the generic characteristic *Taeniophyllum* may be made to receive also *Sarcochilus phyllorrhizus* and those few of its allies, which are likewise leafless and have the same fasciate roots.

Corymbis veratrifolia.—Coast forests of Apia.—BETCHE

Already Blume observed (fl. Jav. iv, 125), that it is optional to use the wording of either *Corymbis* or *Corymborchis*, as Du Petit-Thouars, in his *Tableau des genres d'Orchidées des Iles Australes d'Afrique*, used both names.

The above important contribution, together with great press of other matter, has compelled us to add four extra pages to the present issue. Should this pressure continue, we will soon be obliged to permanently increase the size and price of the "Record."

PROCEEDINGS OF SOCIETIES.

THE ROYAL SOCIETY OF VICTORIA.

ORDINARY MEETING.

The monthly meeting of the Royal Society of Victoria was held on Thursday, 8th September, the President, Mr. Ellery, in the chair.

Messrs. H. Rosales and Thomas Main were elected members. Messrs F. Walsh and A. Wills were elected associates, and Mr. M. Hall elected a corresponding member.

Attention was directed to a new form of galvanometer, which had been described with some *ecclat* in the *Telegraph* for January, 1881. This was shown to be identical in principle with one invented by the late Mr. S. Patching, and exhibited before this Society in October, 1879.

Mr. R. E. Josephs read an interesting paper describing the various forms of Electric Fire Alarms now used in America, and suggesting that the system should be adopted here, as its use caused a great saving of time, and consequently of property, by giving notice of all fires so much speedier than by any other means. Mr. Josephs then described a system invented by himself, which seemed to afford special facilities for the conveyance of alarms, while the liability to get out of order was reduced to a minimum.

Mr. Kirkland, junr., then read a paper on "Faure's Secondary Cells," detailing the results of a long series of experiments conducted by himself, tending to show the great utility of these cells. A series of five cells was then shown that had been charged from a battery in the University, and several interesting illustrations of their use were given—both in series and in quantity. The speed with which a column of water was decomposed in a voltameter was astonishing, and elicited hearty applause. Mr. Kirkland replied to a number of queries on the subject, and stated that he considered lead somewhat unsuitable as the basis of the electrodes, that he was experimenting with a view to find an efficient substitute, that so far he had found the cells to retain electricity longer when charged slowly from an ordinary battery than when charged quickly from a dynamo-electric machine. An interesting discussion followed, chiefly on the chemical changes resulting from charging and discharging the cells; other members undertaking to experiment on the cells Mr. Kirkland was requested to bring the subject before the Society on a future occasion.

ANNUAL CONVERSAZIONE.

The Annual Conversazione of the Royal Society of Victoria was held on Tuesday, 27th September. There were about 200 visitors, who evinced much interest in the addresses, and the large variety of objects submitted for inspection. The President, Mr. R. L. J. Ellery, delivered his annual address. We regret that pressure upon our limited space prevents our giving prominence to this. Mr. Foord gave a brief description of the Japanese Magic Mirrors, and exhibited

several for inspection. Mr. Sutherland fully described Plante's and Faure's secondary cells, illustrating his descriptions by beautiful drawings on the blackboard. In each room of the building a variety of objects were shown, which, with interesting experiments of various sorts, made the evening pass very pleasantly. Mr. Kirkland exhibited a fine series of electrical apparatus in operation, the necessary force being obtained from a battery of six Faure's cells. Mr. Slater showed Lockwood's gravity battery, Siemen's telephone, the Crossley telephone, and the Gower-bell telephone. Some of these were worked in connection with another part of the building. Mr. Kernot showed some excellent polariscopes with blocks of chilled glass to exhibit their effects. Mr. Selby had some beautiful Geisler's tubes, and a fine induction coil. Mr. Quarrie had an arduous time of it with a very good phonograph kindly lent by Mr. McGowan, of the Telegraph Department. This was surrounded by crowds the whole evening, to whom it afforded considerable amusement. Mr. Seitz exhibited an Electric Fire Alarm, and a model of a new Fire Escape. Mr. La Mert showed fine specimens of castings in Spence's metal, and gave practical evidence of its utility by taking castings of various objects. Some of the most delicate description were faithfully impressed upon the metal. Mr. Crocker exhibited his patented process of drawing on glass, with a resinous ink kept fluid by means of a pen heated by a tiny jet of gas. The drawings are afterwards submitted to the action of hydrofluoric acid, which erodes the glass, leaving the drawings in relief, thus forming suitable blocks for printing; the results being considered better than wood-cuts, besides being much less expensive. The Microscopical Society of Victoria sent a contingent of its members, who exhibited several fine microscopes and objects of much interest. Mr. Bale had a series of neat slides of Diatoms, all of his own mounting. These were beautiful objects, and evidenced rare skill in their preparation. Mr. Goldstein showed a variety of interesting slides, also some living objects—one of which, a small *Amphipod* from the Yarra, was specially interesting as showing the circulation of the blood very distinctly. Mr. J. Trowbridge showed a series of botanical slides. Mr. G. Trowbridge showed crystals of various salts with the polariscope; these were much admired. Mr. Morley also showed polariscope objects, and Mr. E. Howitt showed two remarkably good series of slides, one of wood sections, beautifully prepared by Mr. Barnard. The other comprised a choice lot of petrographic slides, prepared by Mr. A. W. Howitt, of Sale.

Tea, coffee, and light refreshments were plentifully supplied to visitors, and the evening, taken altogether, was a most enjoyable one.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The usual monthly meeting of the Field Naturalists' Club of Victoria was held at the Royal Society's Hall on Monday evening, the 12th inst., there being a good attendance of members. Mr. J. R. Y. Goldstein, one of the Vice-Presidents, occupied the chair. The following were elected as members, viz.:—Mrs. F. S. Dobson, Messrs R. K. Bancroft, D. Wilkie, H. Searle, J. B. Harrison, F. H. Du Boulay,

L. S. Christie—Milligan—Leadbeter, and W. Worcester. Several nominations for membership were received.

The papers read comprised—one on the “Marine Fauna of the Eastern Coast of Australia, by Mr. W. A. Haswell, being a detailed description of the various genera common to the N. S. W. and Queensland Coasts; one on the Hairless Blacks of North Queensland by Mr. T. A. F. Leith, who merely drew attention to the comparatively recent discovery of this interesting form of human nature; one by Mr. Thomas G. Sloane, on the “*Carenums* of Mulwala,” New South Wales, being an interesting description of the few members of this family to be there found, and explaining their habits and the method of discovering them, or determining their presence; and concluding with the first of an intended series on Geology, by Dr. T. P. Lucas: the last afforded scope for considerable discussion, which was duly availed of by many of those present.

Amongst a number of interesting exhibits may be mentioned a Lizard, the *Tuatara* (*Sphynodon punctatum*), by Mr. D. Le Souëf; 17 species of Hawk-moths by Mr. C. French; a fine series of shells of the genus *Cypræa*, by Mr. J. F. Bailey; and by Mr. W. R. Guilfoyle, seed-vessels of *Bombax pentandra*—the Kapok of commerce.

At the next meeting Mr. C. French will continue his paper on the description of Victorian Ferns, Mr. D. Le Souëf will contribute one on Snakes, Mr. J. F. Bailey one on shells, and Mr. J. R. Y. Goldstein will read the first of a proposed series entitled Elementary Studies in Biology.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The ordinary meeting of the Microscopical Society of Victoria was held on Thursday, 29th Sept. The President, Dr. Ralph, occupied the chair. There was a fair attendance of members. The evening was fully occupied with a discussion on Mr. Wooster's newly-discovered method of illumination for opaque objects under high powers. This had formed the subject of a paper read at a previous meeting, when it was supposed that the peculiarly fine illumination was owing to oblique rays of light reflected from the silvered nose of the objective. Subsequent examination, however, proved that such was not the case. The result of the discussion tended to show that the effects noticed by Mr. Wooster had been obtained by causing the light to strike the glass slide from above at such an angle that the rays, after refraction, were reflected from the lower surface of the slide to the upper surface of the thin cover and thence on to the object, producing an effect similar to that obtained by Wenham's reflex illuminator worked with light from below the slide. The discovery is likely to prove very interesting. Several members undertook to experiment on the matter, the results to be made known at a future meeting.



THE ROYAL SOCIETY OF NEW SOUTH WALES.

ORDINARY MEETING.

A general monthly meeting of the Royal Society of New South Wales was held on Wednesday, Sept. 7th, at the Society's house, Elizabeth-street. Mr. Russell, Government Astronomer (the President of the Society), was in the chair. After the confirmation of the minutes of the last meeting, the members proceeded to a ballot for the admission of new members, which resulted in the acceptance of Mr. T. F. Furber, Dr. M'Lean, Mr. F. L. S. Smyth, and Mr. W. H. O'Malley Wood. The President said that eighty donations had come to hand during the last month.

Mr. J. Tebbutt, F.R.A.S., read a paper on Comet II., 1881, a short paper, but the result of a considerable amount of calculation. Mr. Tebbutt expressed his opinion that the comet in question, first seen in Australia in May last, was neither that of 1817 nor that of 1861, but in all probability that of the great comet of 1807, and described the calculations upon which he based his supposition. A unanimous vote of thanks was accorded to Mr. Tebbutt, the first to discover the comet in the southern hemisphere, for his valuable and interesting paper. There being no other business before the Society, Mr. Moore drew attention to the extraordinary temperatures observable in the county of Cumboeland, and suggested that members should make observations on the temperature and the rainfall, upon which a lengthened conversation ensued.

ANNUAL CONVERSAZIONE.

The Annual Conversazione of the Royal Society of New South Wales was held in the large hall at the Sydney University on 28th September. There was a large and influential gathering of visitors, upwards of six hundred being present. His Excellency Lord Loftus was present with Lady Loftus, and attended by Lieutenant Bloxsome. There was a large number of varied and interesting exhibits ranged round the hall. Mr. Cracknell, Superintendent of Telegraphs, supplied a full-sized specimen of Faure's secondary cell weighing about 200lbs. This had been charged the same day from a strong battery of twelve Bunsen's cells, and supplied all the electricity used during the evening for a great number of experiments and electric apparatus. Mr. J. Kinlock, B.A., exhibited a new illuminating agent called "portable gas," invented and patented by Mr. F. de Lacy Richards, of St. Leonards, New South Wales: it consists of a very clear fluid obtained from shale after kerosene and other extracts have been taken. The liquid is burned in a lamp with a peculiar burner. The light is very powerful, a small jet being equal to 15 candles, but with another burner a flame of beautifully white light six inches square can be obtained. There was a fine series of exhibits shown used in modern bee culture, principally from America. Several of these were new and strange: perhaps the most novel was a hive supplied with artificial comb, which the bees readily adopted, from which the honey can easily be extracted and the comb returned to the hive to be used again and again, causing much economy of time and a great gain in the yield of honey. There were several exhibits from the Sydney Mint, the most notable being a beautifully constructed assay balance lately made by

Dertling, with a straight beam and a reflector, so delicately accurate that it will register the ten-thousandth part of a grain. There was also a grand collection of minerals and fossils, found in New South Wales. Mr. H. C. Russell, Government Astronomer, exhibited some newly constructed instruments from the Observatory. There were also some very fine Theodolites lately imported. A very fine equatorial clock-heliostat, constructed by Tornaghi, of Sydney, from the design of Mr. Poale, of the Survey department, was much admired; the instrument is so arranged that an image of the Sun can be kept on the one spot several hours, and flash signals can be read at 80 miles distance.

The above are only a few of the exhibits shown. Our limited space will not allow of further description, or even a list of the many beautiful things that served to interest the crowd of visitors until a late hour. The *Conversazione* was a great success, and reflects the highest credit on the officers of the Society who superintended all the arrangements.

THE ROYAL SOCIETY OF TASMANIA.

The monthly evening meeting of the Society was held on Monday, the 12th September; His Excellency Sir John Henry Lefroy, K.C.M.G. (the President), in the chair.

Messrs. William Crosby, jun., of Hobart, and S. H. Wintle, F.L.S., of George's Bay, were duly elected as Fellows of the Society.

His Excellency the President read a paper "On the Magnetic Variation at Hobart, and its change in amount since last determined."

Mr. C. H. Grant observed that this Society, and the public generally, were under a deep obligation to His Excellency for bringing under their notice the very practical matter now occupying their attention. Owing to the system of survey of properties now adopted in this colony, it is certain that the variation in the magnetic deviation must lead to errors and confusion, resulting in much annoyance and litigation. One of the first matters to engage attention should be the careful determination and official record of the magnetic deviation from year to year in different localities.

Captain Stanley remarked, that in order to determine with accuracy the variation of the compass, a good azimuth compass was a matter of great importance; it was also very necessary to take magnetic bearings on numerous points of the compass.

Further discussion followed, in which Mr. Justice Dobson, Mr. Clarke, and Mr. Stephens took part, with the Chairman and the previous speakers.

Mr. Stephens read "Notes on the proposal for establishing a 'Class Ground' for typical plants, in the Society's Gardens."

Considerable discussion ensued, eliciting a diversity of opinion on the adoption of the proposal, in which His Excellency, Mr. Swan, and others, took part.

The proceedings closed with the usual vote of thanks to the authors of the papers read, and to the donors of presentations.

DUNEDIN NATURALISTS' FIELD CLUB.

The annual meeting was held in the Museum on 28th June, the President (Mr. D. Petrie, M. A.) in the chair.

The Secretary read the Annual Report as follows :—

“The Committee of the Dunedin Naturalists' Field Club has much pleasure in presenting its Annual Report to the members, and in congratulating them on the very satisfactory progress made during the past season. After struggling against many difficulties and disadvantages for nine years, the Club has at the close of its first decade made an excellent start in a practical direction. At the commencement of the season a list of the proposed excursions was prepared and printed on the member's tickets, and a copy sent to each member. Of the total number of excursions on the list—viz., sixteen—five fell through owing to wet weather or the inability of members to be present, but the other eleven were well attended, and much interest was manifested in them.

“Hitherto most of the members have devoted their attention to the botany of the district, and chiefly to the flowering plants and ferns. This branch has received the chief share of attention this season also, but it is a matter for congratulation that several members have taken up other lines of work. Mr. T. Chalmer has collected Coleoptera, and has obtained about 100 species. Mr. P. Fulton has made a collection of about 90 species of Lepidoptera, and Mr. A. Purdie, jun., has several hundred species belonging to several orders. Others have also joined in similar work, and it is hoped that many members will thus specialize their efforts and devote themselves to one branch, so that the general knowledge of our local fauna and flora may be much increased.

“The Committee offered prizes at the commencement of the season for various collections. For the best collection of dried plants there were three competitors, and the Special Committee appointed for the purpose decided to award the prize to Mr. S. Fulton. Mr. P. Martin's collection, though larger, did not fully comply with the conditions, as his plants were not mounted. The thanks of the Club are due to the President (Mr. D. Petrie) for a present of books for this prize. Special prizes were adjudged to Messrs Chalmer and P. Fulton for their collections of insects.

“As the excursion season drew to a close, it was resolved to hold indoor meetings once a month during winter, at which members might exchange specimens, exhibit objects, and discuss matters of interest. Two of these have already been held, and have proved very successful.

“In order to aid the work of members in a practical direction, the Committee resolved to make collections of the various botanical and zoological objects to be found in the neighbourhood. A commencement has accordingly been made in obtaining a herbarium of the local plants. For this purpose a suitable case has been purchased, together with a supply of paper, &c., for mounting the collection on. Carefully preserved specimens of various plants have been presented by Messrs. Petrie, S. Fulton, Deans, and Thomson, and these have been mounted

by Misses Chapman, I. and A. Gillies, Harlock, Pratt, and Burnside and Messrs Ivens and P. Martin. Although only just started, the collection already contains about 160 species. In course of time other collections will be set on foot. It is intended that these shall be made as complete as possible, and be accessible to all the members who wish to refer to them. Professor Parker has kindly granted the use of a room in the Museum for keeping the herbarium and holding meetings in.

"The membership for the past year amounts to 49, which, though not a great numerical advance on the past year, represents a considerable accession of working strength.

"The balance-sheet shows that the total receipts for the year, including a balance of £5 13s. 2d. from the previous year, amount to £17 18s. 2d., while the expenditure amounts to £18 14s. 4d., leaving a debit balance of 16s. 2d. The purchase of the herbarium case and other necessities for the plant collection formed an extraordinary item of expenditure, such as will not probably be incurred again for two or three seasons, so that the financial position of the Club is thoroughly good, the ordinary revenue being more than sufficient for the ordinary expenses.

"Your Committee have to recommend that the Report for the season be printed as usual; that a list of additions, corrections, &c., to last year's list of flowering plants be added; and that a list of the ferns to be found in the neighbourhood of Dunedin be drawn up and included. They would also suggest that the incoming Committee be empowered to draw up a programme of proposed meetings, prizes, &c., for the ensuing season.

"In conclusion, they would express the hope that in the second decade of its existence the Dunedin Naturalists' Field Club may prove an active and efficient agency for the furtherance of scientific knowledge in our midst.

"The adoption of the Report was carried unanimously.

"Officers for the ensuing year were elected as follows:—Messrs D. Petrie, M. A., President; George M. Thomson, F.L.S., Hon. Secretary; P. Fulton, Hon. Treasurer; Anderson, Chalmer, Deans, S. Fulton, Joachim, Purdie, and Webb, members of Committee."

The above annual report has been printed in a pamphlet of 16 pages containing the rules of the Club; list of members; reports of the excursions; reports of the indoor meetings; a list of 17 prizes offered for competition; collections to be made during the present season; a list of additions to the catalogue of flowering plants in the neighbourhood of Dunedin; a list of introduced plants; and a catalogue of 72 species of ferns and other vascular cryptograms occurring near Dunedin. Altogether the report is a valuable one, and reflects the highest credit on the Secretary and the Committee. The long list of prizes for the best collections of botanical, zoological, and general specimens ought to impart a healthy stimulus to the objects of the Club. We hope to be furnished regularly with reports of the meetings as they occur.



NEW ZEALAND INSTITUTE.

WELLINGTON PHILOSOPHICAL SOCIETY.

The first general meeting of the Wellington Philosophical Society, was held at the Museum on Saturday evening, 6th August, 1881. Dr Hector, F.R.S., (President) in the chair. The following members were elected :—Messrs. Toulson, Lidbetter, Thistle, and the Rev. La Menant des Chesnais. The President delivered an address, in which he reviewed the remarkable progress which had been made in the colony in scientific pursuits since the time when the Institute was first established, and pointed out that while most branches of education—primary, secondary, and university—were now well provided for, there was still a great want of facilities for technical education. The constitution of the New Zealand Institute provided for this; but that part of the Act had remained a dead letter, owing, in part, to the mistaken notion that the Universities could provide such training. This, however, was not the case, as the University student must devote the whole of his time to his studies. What is wanted is the teaching of applied science, and other branches of education, by means of evening lectures, to those who are engaged in business during the day. Such provision is now being made in the other colonies, and New Zealand should not be behindhand, as it would do more for developing the colonial industries on a sound basis than the mere granting of bonuses or the imposition of the protective duties. In describing the present state of our knowledge in various branches of science, he gave an account of the conclusions arrived at, in Wallace's recent work on "Island Life," with regard to the origin of the New Zealand fauna and flora, which he considers to have been in part derived from the eastern part of Australia when it formed an island separated from the western portion by an extension of the tropical sea. When these two islands were joined, the western forms of life displaced the eastern, and caused the great dissimilarity which now exists between Australia as a whole and New Zealand. He showed reasons, however, for still maintaining that New Zealand was at one time a portion of an extended antarctic continent that included part of South America, which was the view brought before the Society by Professor Hutton, but which Mr. Wallace considers untenable. Referring to the work of the Meteorological Department, he gave a description, with diagrams, of the operations of the inter-colonial weather exchanges which have been lately instituted, and explained the manner in which it had been found from experience that storms skirting the south coast of Australia approach New Zealand from the westward, travelling at the rate of about 400 miles a day. After dealing with this subject in detail, he drew attention to the advantages which would be gained from the establishment of a magnetical observatory in New Zealand. The address, which occupied about an hour, was listened to with great interest.

A number of recent additions to the museum were displayed on the table, amongst which were remains of the *Kekenodon*, discovered in the Waitaki District, and described by Dr. Hector in *Trans., N. Z. Institute.*, vol. xiii., p. 435.

A paper by Mr. Buchanan, on the "Lung-worm in Sheep" was read, the discussion of it bringing the evening to a close.

The second meeting of this Society was held at the Museum on the 20th August; Dr. Hector, President, in the chair. The following papers were read:—

1. "On the Sand Dunes in the Provincial District of Wellington," by W. T. L. Travers, F.L.S.

2. "On some new Species of Plants found in the South Island by I. Buchanan, F.L.S., viz., *Veronica Muelleri*, *Raoulia Mackayi*, *Raoulia Parkii*, and *Aciphylla Hectori*."

Dr. Hector explained that this was the first of a series of papers by the author, the result of a botanical expedition which he made last year in the Otago Alps. It was curious that comparatively few new species had been added to the New Zealand flora from this locality, although it had not been visited since 1863, when Mr. Buchanan, in company with himself, had examined and collected from it.

An interesting discussion took place with regard to the spear-grass and its properties.

Mr. Travers pointed out the wonderful manner in which the flower-stalk is protected by spines, without any obvious purpose.

Dr. Hector thought it must have protected the plant from being destroyed by the moa in former times.

3. "On Marine Planarians, or Leaf Worms," by W. W. Kirk.

4. "On Additions to New Zealand Shells," by the same gentleman. As these papers were technical, and gave descriptions of the specimens, they were taken as read.

5. "On the supposed Paraffine at Wiapu," by W. Skey, which went to show that this was not such a valuable discovery as was supposed. He considered that both Mr. Dixon, of Sydney, and Mr. Cosmo Newbery, of Melbourne, whose analyses had been published, had overlooked the presence of above 50 per cent. of a valueless oxidised hydrocarbon, allied to dopplerite, and had included it as paraffine, thereby giving an apparent value which it did not possess, in consequence of which it was spoken of as a deposit of paraffine. Dr. Hector gave an interesting account of the locality, and of how the substance occurred, being the petroleum that escapes from surface wells altered by oxidation into a kind of mineral grease.

6. "On Poisonous Property in the Plant *Brachyglottis ripanda*, or *Rangiora*," by W. Skey.

The above papers were fully discussed, and the meeting was then adjourned until September 3rd.

The third meeting was held at the Museum on Saturday, Sept. 3rd, Dr. Hector (President) in the chair. The Secretary announced the election of Mr. Edward R. Chudleigh as a member of the Society. The following papers were read:—

1. On the "*Notornis*," by Dr. Buller, C.M.G., F.R.S. The author gave the history of the discovery of the only three known examples of *Notornis Mantelli*, at localities in the South Island nearly a hundred miles apart, and over an interval of 35 years. The first of



THE

SOUTHERN SCIENCE RECORD.

MELBOURNE, NOVEMBER, 1881.

ON A NEW CRETACEOUS DEPOSIT IN QUEENSLAND.

BY THE REV. J. E. TENISON-WOODS, F.G.S., F.L.S., VICE-PRESIDENT
LINNEAN SOCIETY, NEW SOUTH WALES, &c.

There was a time when it was believed that Australia did not possess any Mesozoic formation, and many were the curious speculations which that supposition gave rise to. Coupled with the mesozoic aspect of our fauna and flora, it was thought that this continent, or at least the east and west sides of it, had never been under the sea since the good old palaeozoic times of Brachiopods and Trilobites. It was Sir Thomas Mitchell who first found some mesozoic fossils in the waters of the Balonne, and these discoveries were speedily followed by others by Leichhardt and Kennedy. Some of the fossils were cretaceous, or the very uppermost of the mesozoic series. But they were not recognised as such. They were never carefully examined by a competent authority, and were generally set down by geologists of the day as probably Jurassic, or even older. I say that some must have been cretaceous, for they came from localities where I have found cretaceous fossils; and moreover, in many of the old collections of fossils these cretaceous evidences from the western interior are still to be seen.

It was Professor McCoy, I believe, who first pronounced that Australia possessed characteristic cretaceous deposits. He made the announcement in March 1857, as well as I remember, at a meeting of the Royal Society of Victoria. The specimens were exhibited at the time, and consisted not only of shells but of saurian remains. Queensland was not much explored in those days, yet I very much wonder that the discovery made by my esteemed and learned friend was not made before. The fact is that the whole of the western country is covered with these fossils. All along the Barcoo and its many tributaries, wherever a well is sunk or the ground opened, fossils are sure to be seen. Belemnites are the most common, but there are other very characteristic forms

In 1872 Mr. Daintree published his essay on the geology of Queensland, and in that essay Mr. Etheridge determined a number of fossils from Maryborough, which he referred to the Lower Cretaceous period probably representing the Gault of England. Unfortunately all the shells were casts, and nothing very decided could be concluded from them. This was the first discovery on the east side of the dividing range. Maryborough is on the shores of the Pacific 150 miles north of Brisbane. There was only one small quarry of the fossils, situated scarcely 40 feet above the sea-level. Since then I find that fossils of the western plains, or of the upper cretaceous beds, are found on the very

these, obtained by the Hon. Walter Mantell, in 1849, was caught alive by a party of sealers at Duck Cove, on Resolution Island, Dusky Bay. Three years later the same gentleman procured another from a party of Natives, who had captured it with dogs on Secretary Island, opposite the Deas Cove, Thompson Sound. Both of these specimens were forwarded to the British Museum, where to this day they stand side by side, and, like the remains of the Dodo in the adjoining case, attract the attention of thousands of eager visitors. And now, after a lapse of more than 30 years, a third specimen has been captured at a place called the "Bare Patch."

Sir William Fox mentioned that he had frequently seen the two first specimens alluded to by the author in the galleries of the British Museum, where, on account of their rarity, they evidently attracted a considerable amount of attention.

Dr. Hector said he had made inquiries in 1863 about Mr. Mantell's specimens, and, from the Natives who actually caught them, learnt the precise localities, as stated by the authors, to whom he had communicated the information. He considered it very remarkable that the only three specimens of such a large and conspicuous bird had been obtained in places so far apart, and thought it most likely that there were still plenty of survivors in the south-west of Otago, where there were over 600 square miles of country that had never been explored even to this day.

Dr. Buller said he was glad his paper had evoked so much interesting discussion. In vindication of the name by which this bird was now distinguished (*Notornis Mantelli*), he wished to explain that, more than a year before the discovery of the bird itself on Resolution Island, Professor Owen had drawn the generic characters of a large brevipennate Rail, then supposed to be extinct, from the fossil remains collected by Mr. Mantell, and had named it *Notornis*, dedicating the species to the discoverer of the bones. It was somewhat curious that it should have fallen to the lot of the same scientific explorer to discover the living bird itself, and although Mr. Mantell now modestly disclaimed any merit, it seemed peculiarly fitting and right that, in commemoration of his services, his name should be permanently associated with the species.

2. "On the Great Flood of 1868," by W. T. L. Travers, F.L.S. This paper described in a most interesting manner the extraordinary changes that were effected in the surface features of the Amuri country by the above flood, the author showing reasons for believing that no such flood had ever occurred previously during the last geological epoch and since the rivers had occupied their present channels. As the paper raised many points of argument, on the motion of Dr. Buller, seconded by Mr. Chapman, the debate upon it was adjourned until next meeting.

Dr. Buller gave a description of some birds which he had lately presented to the Museum, among them being several hybrids.

The President called attention to a specimen of tin found near Reefton, and stated that this was the first authentic discovery of this mineral in New Zealand.

Several important papers had to be postponed owing to the lateness of the hour, and the meeting adjourned until the 17th inst.

summit of the dividing range near Dalby. I have not seen the beds, but the fossils are those of the western interior deposits.

In February last I was travelling on the then unopened line from Bundaberg to Mount Perry. The contractors very kindly lent me the pilot engine to travel along the line and examine the sections in the cuttings. About 10 miles from Bundaberg, and not far from the Burnett River, I saw in a small cutting some highly inclined beds of Fuller's earth with bands of ferruginous sandstone. Amid the rubble I found one imperfect fossil: it was the conjoined valves of a *Cardium*, probably new, which I propose calling *C. affine*, from its resemblance to some European form. I was not able to find another fossil during a prolonged search.

Twice I visited the same locality, and was unsuccessful in finding fossils. In July last, however, accompanied by Mr. Weedon, the Chief Engineer, and Mr. Falconer (a working geologist, the discoverer of coal in this district) I made a final attempt. After spending the afternoon in breaking stones, we were suddenly rewarded by coming on a mass of fossils all beautifully preserved in hydrated peroxide of iron. A very little examination enabled me to identify these remains with the fossils determined by Mr. Etheridge, only there are many new species, and the outside markings are beautifully preserved. The stone is white, and the remains are surrounded by a bright red patch of ferric oxide. No doubt the beds contain much colorless protoxide of iron in chemical composition. The decomposition of the animal tissue of the shells supplied the oxygen for the ferric oxide, and hence the bright red color around the fossil. The fossils are beautifully preserved, and quite supply the deficiencies of the Maryborough beds.

It is not my intention now to enter into a detailed description of the fossils, which are numerous, though sparsely distributed through the stone. This must form the subject of a more lengthy paper. I only wish now to mention that these beds may be expected to appear extensively on the east as well as the west side of the dividing ranges, and they are covered on both sides by the "Desert Sandstone" of Daintree. The latter is clearly a *Æolian* formation, and has been formed by *aërial* action on decomposing rocks after the chalk beds were raised from the sea.

The important conclusion to be drawn from this is that all the east side of the continent as far as Cape Byron has been raised from the sea at the close of the mesozoic period; and as marine beds are found on the summit of the range we may safely say that this side of Australia was under the sea in the mesozoic times. I will go further and say all Australia, for I believe that the mesozoic marine fossils of Western Australia, though older, point to the same conclusion. The Desert sandstone is a tertiary deposit, but I shall have much to say on this formation shortly. It has formed the subject of attentive study for two years, the results of which I am now engaged in preparing for publication.

The beds of cretaceous fossils here referred to are about 85 miles N. by W. from Maryborough, about 24 miles from the sea, 250 feet above it.



THE CARENUMS OF MULWALA.

BY THOMAS G. SLOANE.

[Read before the Field Naturalists' Club of Victoria 14th September, 1881.]

Mulwala is in New South Wales, situated on the Murray, and on, or very nearly on, the 146th parallel of east longitude: it is marked on any good map of New South Wales.

By the term "*Carenum*," which is used in a general sense in this paper, I mean all those beetles which were formerly placed in the genus *Carenum*, with the addition of Mr. McLeay's genus *Euryseaphus*. This portion of the *Scaritidæ*, though found in every part of Australia, seems to reach its greatest development in the hot and arid interior, and to be very scarce in the more fertile south-eastern corner. Out of one hundred and twenty-one species given in Masters' "Catalogue" only five are put down as Victorian; but many of the species credited there to New South Wales and South Australia are also sure to extend into the adjacent parts of Victoria: and here I would advise any field naturalist, who may be in the drier and more northern parts of Victoria between now and the end of the year, to look industriously for *Carenums* under all sticks and stones; for these beetles are good burrowers, and like well to have a log above them. There are no doubt many sorts to be found, and some of them would most likely prove new. Where the soil is sandy or loamy is the best place to look for them — all the most remarkable species at Mulwala are found in sandy places.

The original genus *Carenum* is now broken up into no less than seven different genera: of these, five have representatives at Mulwala, viz., *Carenum*, *Philoscaphus*, *Eutoma*, *Carenidium*, and *Conopterum*. In the present paper I will confine my attention to the first-named genus, of which I have five species. I may here remark, that there are found at Mulwala two species of *Philoscaphus*, and one species of each of the other genera mentioned. A single species of *Euryseaphus* is also found at Mulwala.

I am sorry to say that I know little about the habits of the *Carenums*, except where to find them. It is my opinion that they emerge from the pupa state about the end of Winter; as I have found specimens in the early Spring which were quite soft. Hereabouts they are found under logs—there being little stone in the neighbourhood. I have noticed that the *Carenum* usually has a hole into which it retreats at once if disturbed. These holes I used to ascribe to lizards, but experience has shown me that a *Carenum* is generally the maker; so if I turn a log in a suitable place, and see a hole under it without any ants coming out, I at once conclude it belongs to a *Carenum*, and begin to dig, when the chances are that I shall unearth a *Carenum*, a *Philoscaphus*, or a *Euryseaphus*; for these are all good diggers—especially the two last. Spring is the best time for these beetles, though they are to be found in the Autumn, after heavy rain, and a stray specimen may be taken even in the depth of Winter.

Mr. McLeay has carefully divided the genus *Carenum* into many different groups, which are of great assistance to the beginner. His two main groups are the *bidentate*, or those with two teeth on the fore

tibial—and the *tridentate*, or those with three teeth on the fore tibial: these are further sub-divided into lesser groups, which it is beyond the scope of this paper to enter fully into, but any one who is curious on the subject will find Mr. McLeay's list in vol. I of the "Transactions of the Entomological Society" of New South Wales, page 196. Of the five *Mulwala* species of *Carenum* three belong to the bidentate group: these I will take first. Mr. McLeay divides this group into those with the thorax broader than long, and those with the thorax longer than broad. Our first example has the thorax long.

1. *Carenum*, sp.—I am doubtful about the specific name, but I think it is *C. scariaioides* (WESTWOOD): if it be so, its range will be great, *C. scariaioides* being found over a large part of New South Wales and South Australia, as well as in Victoria. It belongs to the same group as the Victorian species *C. intermedium*, and, like it, has four punctures on the elytra, two near the shoulders and two near the apex. It has a narrow edge of deep purple along the margin of the body and thorax—though by lamplight it looks simply shining black. This species is very general in its distribution about *Mulwala*, but specimens are not often found. It seems more common in Autumn than any other *Carenum* about here; I have seen several taken in April, and even as late as the end of May; but September is the best month to find it. Its movements are slow, and it lies as though dead if disturbed: this pretence of death is, however, quite a family trait among the *Carenums*. In length it measures about 1 inch.

2. *Carenum interruptum*—(MCLEAY).—Belongs to the broad thorax group. It is a broader, flatter, and altogether larger beetle than the last. In colour it is dull black, with a purple margin round the elytra and thorax, which relieves it a little; but on the whole it presents a heavy appearance to the eye. There are four punctures on the elytra situated as in the last species. Its length is one inch. *C. interruptum* has a wide range in New South Wales, being found as far east as Goulbourn. This species is found on the sandhills so common about here, nor have I even taken it except in very sandy places: it is the most plentiful *Carenum* hereabouts, and may be found during the months of September, October, and November; also, occasionally in the Autumn.

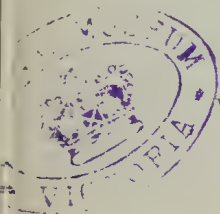
Carenum sp.—I do not know the name of this species. It is a much glossier and lighter insect than the last, from which it is easily distinguished by having two punctures, towards the apex, on the elytra, and by its more convex shape. The thorax is broader than long: the bluish margin to the thorax and body is wider, and brighter than in either of the two last-mentioned species. It is more variable in size and appearance than *C. interruptum*, my specimens ranging from nine to eleven lines in length. I have generally found it where the soil was light, seldom in very sandy places; and I have noticed that specimens found in stiff soil are not so bright as those found in more sandy ground. It is the best digger of the genus *Carenum* found here; its holes are long, but keep near the surface. Taken in September and October.

I come now to the *tridentate* group, of which *Mulwala* gives us two examples; these differ widely from the others I have mentioned

in having the elytra marked with depressions; the antennæ, too, are more bead-like, and increase in thickness towards the end.

4. *Curenium* sp.—This I believe to be a new species—though on no very sure grounds. It is a very pretty little beetle, though its colour is only dull black. There are four rows of depressions on each elytron, and, though this is always the case, the number of punctures varies in different specimens from eleven to nine in the first row, that is, the row next the suture; from nine to six in the second; from eight to six in the third; and from six to five in the fourth. Besides these four rows, there is a row of small punctures all along the margin of the elytra. I found this insect for the first time, last year, from the middle of September to the middle of November, in light soil, rather sandy, and covered with pine scrub. It does not seem to be a good digger. My specimens vary in length from six to nine lines.

5. *Carenium loculosum*—(NEWMAN).—This species, as found at Mulwala, presents two well marked varieties—for I cannot find sufficient differences to justify me in regarding them as distinct species,—though they look very like it, besides, although I have now no specimens in my collection which connects them, I used to have, if my memory serves me rightly. Should I find any specimen which seems to unite them, during the coming spring, I will send it to the Club. From Mr. McLeay's description—for I have never seen the beetle itself—I should consider the large variety as his *C. variolosum*, while the small sort is without doubt the Victorian species *loculosum*. The two varieties are taken together, both liking sandy soil, and, like the last species, they appear to be poor diggers. This species differs from the last by having the shoulders more rounded, and by the depressions on the elytra showing no attempt at order. The small specimen now shown, which is a fair example of the lesser variety, is eight lines long; the large specimen, which is a big one of its kind,—measures eleven lines in length. This beetle seems to appear for a shorter time than the others; I have only found it about the month of September.



VICTORIAN FERNS AND THEIR HABITATS.

BY C. FRENCH.

PART V.

Lomaria lanceolata—(SPRENGEL).—A very handsome species found growing on the dark and shady banks of watercourses in Fern-tree gullies throughout the colony. This plant is of little use for decoration, but for artificial rockeries, or in collections of cool house ferns it is very useful; and as it is easily grown, it is worthy of the trouble which it takes to cultivate it for the purpose of completing the collection of the indigenous species. This species is to be found plentifully in the Gippsland gullies, also in those of the Dividing Range, but now very sparingly in the Dandenong and Macedon gullies. To grow it well it should be planted in strong clayey soil mixed with coarse sharp sand, and it must have a never-failing supply of water.

This fern grows to the height of from 8 inches to 2 feet. *Stegania lanceolata*, of R. Brown is synonymous with this species. Found, according to Bentham and Mueller, in Tasmania, South Australia, also in New Zealand and the Pacific Islands.

Lomaria alpina—(SPRENGEL).—This pretty, and in Victoria somewhat rare, fern, is the smallest growing of any of the Australian species, and is very useful for artificial rockeries, miniature cataracts, &c., &c. The sterile fronds are of a pleasing green color, and are very stiff and erect. The fertile fronds stand well above the sterile ones, and this helps to make the whole a very compact little plant. In the Buffalo Ranges (so I am informed by a correspondent) this species grows rather plentifully, but I have only been fortunate enough to find it on one occasion, viz., on Mount Juliet, in the Fernshaw district, although it is said to be in abundance in some of the Alpine districts throughout the colony. To grow it well it should be planted in a compost composed principally of soil in which a large per-centage of crushed sandstone, and brick-bats is used. It should not be placed too deep in the pot, as the delicate creeping rhizome is apt to suffer by being planted too far beneath the surface. This is a species which will stand a considerable deal of heat if kept well moistened. It will be observed that the New Zealand species (which may be, I think, regarded as the type) is much more fragile than that which occurs in Victoria, and is even more defined in outline than our native specimens. Height, from 3 to 6 inches. Found in New South Wales, and Tasmania; also in extra-tropical South America and New Zealand.

Lomaria fluviatilis—(SPRENGEL).—This fine species is a general favourite with fern growers, principally on account of its graceful appearance, hardiness, and easy culture. As a decorative plant for the table, it is very useful, and it is also largely used for dwarf work in artificial ferneries, and waterfalls. In the deep park gullies of the Gippsland, Dandenong, and Dividing Range, this species is to be found growing in great luxuriance, the dark green color of the sterile fronds contrasting pleasingly with the brown, erect, and singular fertile or fruiting fronds. To grow it well, it should be planted in very fibry soil composed principally of chopped stems of tree fern, or cocoa-nut fibre. A constant supply of water is indispensable, and if the pot be placed in some vessel of water so much the better. Great care must be taken to keep down thrips and other insects, the attacks of which soon render ferns as well as other plants most unsightly objects. Height, from 1 to 2 feet. The New Zealand specimens seem to be more drooping and graceful in habit than the Victorian ones. Found, according to Bentham and Mueller, in Tasmania and in New Zealand.

Lomaria capensis—(WILLDENOW).—This is the common and well-known fern which tourists may always meet with growing on the banks of creeks throughout the mountain districts of Victoria. It may be easily recognized by the light green and wavy appearance of the fronds, which frequently droop down into the water. This species is one of the most useful of all our indigenous ferns for artificial cultivation, being easily cultivated and equally at home in the cool fernery, open shed, or shady borders. The readiest manner to utilize this species is to

plant it in large clumps around tanks or amongst stones, and you can always depend on success with little or no trouble. This species is said by Bentham to be identical with *Lomaria procera* of Sprengel, but it seems to me to be a very different species. I have noticed that the two ferns are seldom if ever found growing together: the color of the fronds is totally different. In *L. procera* the texture of the fronds is more coriaceous, the fertile fronds are stouter, and more erect, and the whole aspect of the plant seems quite different to that of the typical species. In making these remarks I am not presuming too much, I hope, in saying that I think with Bentham that the study of ferns (and other plants also) in their natural state may furnish many proofs of such a nature as to induce extreme caution in the division of species and distinct varieties. I think those of you who have seen the two ferns alluded to will agree with me that they are different, and I shall always look upon *L. procera* as at least a very distinct variety, if not a different plant altogether. Height, from 2 to 4 feet, and I have seen specimens of *procera* nearly 5 feet high. This fern is found, according to Bentham and others, in Queensland, New South Wales, Tasmania, South Australia, and dispersed over tropical and Southern extra-tropical America, the Malayan Archipelago, South Pacific Islands, &c., and New Zealand.

Lomaria filiformis—(A. CUNNINGHAM).—A very curious and pretty species, found only, I believe, by myself on one occasion in Victoria, viz., at the Springs at Cheltenham, beyond Brighton, many years ago. The specimen referred to was a small plant not in fruit, but was at once recognised by Baron von Müller, to whom I showed it, as *L. filiformis*. In appearance whilst in the growing state, it somewhat resembles the smaller forms of *L. fluviatilis*, but of course the woody little rhizomes and other well marked peculiarities render it quite distinct, even in the puny state, from the above well-known species. When the plant gets matured, the fronds become more lanceolate in their appearance, and it is then easily distinguished from any other known species. In New Zealand it is not uncommon, and if grown in low artificial rockeries, where water can be easily obtainable, it makes a very useful plant. To grow it well, strong soil, mixed, with sharp sand should be used. Height, from one to two feet. Found, according to Bentham and others, in New Zealand and in the Fiji Islands.

Blechnum—(LINNÆUS).

Rhizome, short, thick, and woody, usually covered with shining black scales.

Blechnum cartilagineum—(SWARTZ).—This is a very handsome and well-known fern, found in the vicinity of fern gullies in nearly all of the mountain regions of the colony. In appearance to ordinary observers it is not unlike *Lomaria discolor*, but of course differs in many respects to that cosmopolitan species. The fronds when growing assume a beautiful delicate pink color, which becomes less prominent as the plant becomes more mature. The fructification is very prominent, being borne in a continuous line on each side of the mid-rib, and in this particular it differs very materially from the preceding genus *Lomaria*, in the absence of separate fruiting fronds. In the Dande-

nong, Gippsland, Arthur's Seat, and other ranges, this species may be found in great abundance, and I have noticed particular fine specimens of it in the district of Langwary, on the Gippsland line of Railway, inland some 12 miles from Drouin. When well grown this species makes a very useful dwarf plant for artificial ferneries, rock work, &c. It is very easy of cultivation, as it simply requires a good strong vegetable mould, well pressed down, and if a little burnt wood or ashes be added it will thrive with very little trouble. I once saw a very beautiful variegated form of this species at Gembrook, in the Dandenong Ranges: it was shown to me by Mr. R. Lucas, but I believe it shortly after resumed its usual color. Height, from 1 to 4 feet. This fern is found, according to Bentham and Mueller, in Queensland and in New South Wales. I may add that this species is rather difficult of removal, and it should be done whilst the plant is dormant, say in March and April.

THE SNAKES OF AUSTRALIA.

BY D. LE SOUËF.

[Read before the Field Naturalists' Club of Victoria 10th October, 1881.]

PART I.

CARPET SNAKE—(*Morelia variegata*).—The Carpet Snake is of a uniform dull grey color inclining to green, with irregular-shaped spots or blotches on the body resembling the pattern on a carpet, hence its name; the belly is pale yellow with a few darker spots, the markings varying very little on different specimens; the teeth are solid, very sharp, and curved backwards; tail very short and prehensile, with a pair of rudimentary legs, which assist in securing a firm hold of a branch when climbing. It is one of the few innocuous snakes in Australia, and its range is very extensive, extending over a large portion of the continent. In Victoria, it is only found in the north-western districts, and occurs plentifully on the lower Murray, and also in Riverina. It is nocturnal in its habits, though frequently met with during the day basking in the Sun, and is often found on trees clinging firmly to a branch. Its food consists of bush mice, rats, birds, and other small game, which it destroys by constriction, and, like all the snake tribe, it will only eat food which it destroys itself. Its bite is severe, although it seldom attempts to bite unless irritated. The largest example I have heard of measured 10 feet 6 inches, but it seldom attains such a size, the usual length varying from 4 to 6 feet. Many people think that it is poisonous, but the absence of poison fangs, the number and smallness of its scales, its short prehensile tail, its rudimentary legs, and the small irregular head-shields, prove its harmless character. It does not flatten out its head and neck as a poisonous snake does when irritated, while the scales of the latter are much larger, not being in more than 26 rows, whilst in the other, over 30 rows occur.

The DIAMOND SNAKE (*Morelia spilotes*) is found in a limited district in New South Wales, and here, strange to say, the Carpet Snake does not occur. It is exactly similar in habits and character to the Carpet Snake, but differs in color, being black, with a bright yellow spot in the centre of each scale, and often has a number of diamond-shaped yellow spots on its body: it is also perfectly harmless, although the copper-headed or large-scaled snake (*Hoplocephalus superbus*), which is one of the most venomous snakes in Victoria, is commonly called by the same name, thus causing much confusion as to the harmless nature of the true diamond snake.

PROCEEDINGS OF SOCIETIES.

THE ROYAL SOCIETY OF VICTORIA.

The monthly meeting of the Royal Society was held on 13th Oct., in the Society's hall, the President (Mr. R. L. J. Ellery) in the chair.

Messrs J. Hewlett, C. J. Lucas, and J. D. Kirkland were unanimously elected members of the Society.

Mr. W. W. Culcheth read a paper on the drainage of Melbourne, having immediate reference to the essay to which the Mayor's prize was recently awarded. It first recounted the salient points of the prize essay, remarking that the information given in it was very meagre, and then proceeded to criticise the recommendations made by the essayists. The object of the paper was stated to be to have the defects of the scheme either explained by further information, or removed by modifications of the details. The paper concluded with a hope that the matter will be fully debated, as the scheme proposed in the prize essay appeared at present very incomplete. The discussion on this paper was postponed until next meeting.

Mr. H. Moors read a paper on "The Sea Cell as an Element of Danger in Torpedo Experiments." He said that, as the Board appointed to inquire into the circumstances of the Queenscliff catastrophe had come to the conclusion that the explosion did not occur through or by means of the firing-key, the sea cell current was naturally spoken of as the probable cause of the disaster. Whatever might have been the cause, it seemed clear that in the Queenscliff experiments the experimenters were treading on dangerous ground. All that was necessary to produce a dangerous current was an accidental contact between the end of the wire and the iron body of the vessel. He had not before seen attention called to the danger of the sea cell, but he considered it so great that any officer in charge of an ironclad who would allow of experiments being made from on board with charges in zinc cases would incur a very heavy responsibility.

A brief discussion followed the reading of the paper, and the meeting adjourned.

THE FIELD NATURALISTS' CLUB OF VICTORIA.

The Field Naturalists' Club of Victoria held its usual monthly meeting on Monday evening, 10th Oct., at the Royal Society's Hall, there being a good attendance of members, and Mr. H. Watts occupied the chair. Mr. J. Hedding was elected a member, and several nominations for membership were received.

The papers read were, first, "Continuation of description of Victorian Ferns, by Mr. C. French, comprising the various species of *Lomaria*, *Blechnum*, and *Doodia*; second, "Elementary Studies in Biology," part 1, by Mr. J. R. Y. Goldstein, which consisted principally of a careful definition of the difference between organic and inorganic bodies, between living matter and dead matter, and between plants and animals; third, "Geology," part 2, by Dr. T. P. Lucas, the writer explaining by means of illustrations certain species of granites, and suggesting their possible origin; fourth, "On two species of Australian non-venomous Snakes," by Mr. D. Le Souëf, viz., *Morelia variegata*, or carpet snake, and *M. spilota*, or diamond snake. Fine live specimens of each were exhibited by Mr. Le Souëf, who explained the difference in the position of the head-scales or plates of these and the venomous species.

The usual conversazione and exhibition of specimens followed; amongst the exhibits may be mentioned ten species of Lizards, collected around Melbourne, by Mr. J. E. Dixon; three species of Parroquets, viz., *Cyclopsitta* (McCoy, Leadbeater), *Trichoglossus porphyrocephalus*, and *Corvus parroquet*, by Mr. T. A. F. Leith; a fine series of shells, of the genus *Oliva*, from Western Australia, some of them very rare, by Mr. J. F. Bailey, who also brought for inspection a new make of boxes for collectors, which were much admired, they being a great improvement upon those hitherto in use.

ELEMENTARY MEETING.

In accordance with an announcement made at the regular meeting of the 10th, the first Elementary Meeting of the Field Naturalist's Club of Victoria was held on Monday, 24th ult., at the Royal Society's Hall, there being a fair attendance of members, which will, no doubt, be largely increased, as the usefulness of such meetings to young collectors becomes better known. Messrs Best and French undertook the Entomological portion of instruction, explaining the various parts of an insect, the method for capturing same; also giving some valuable hints relative to preserving and setting out specimens for the cabinet, exhibiting by way of illustration some well-chosen specimens of the various families and genera of the Coleoptera. These gentlemen also brought some unset insects, the results of recent excursions, and upon these the junior members tried their hands with varying success; pins, cork, &c., being also provided for their use. Mr. J. R. Y. Goldstein showed some carefully executed preparations of the various organs of plants, exhibited under the microscope, at the same time explaining in a practical and popular style their structural dif-

ferences and various functions. Mr. Watts was provided with freshly gathered specimens of sea-weed, and explained the best method of preparing and mounting same, either for the herbarium or microscope: he had also some beautifully prepared specimens of fresh-water Algae mounted for the microscope. These short and instructive discourses were listened to very attentively, and more particularly by the younger members, it being the unanimous opinion of those present that the inauguration of these elementary meetings is a step in the proper direction, and cannot fail to more widely extend the usefulness and popularity of the Club. A general conversazione and exhibition of specimens followed, and deserving of especial mention were five species of *Monogramme*, a very rare genus of ferns, by Mr. C. French, who, as well as Mr. Best, had some cabinet drawers of beetles well arranged and named; there were also some well preserved specimens of rare Australian Parrots, by Mr. T. A. F. Leith, and some well chosen preparations of plant sections and sea weeds by Messrs J. R. Y. Goldstein and H. Watts. The meeting, which was a most enjoyable one, did not terminate until a late hour.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held its annual meeting on Thursday, 27th Oct. The President (Dr. Ralph) was in the chair.

The Hon. Treasurer (Mr. R. G. Haig) read his report and balance sheet showing the financial position of the Society to be in a healthy condition.

The election of officers for the ensuing year resulted in replacing Dr. Ralph as President, Rev. J. J. Halley as Vice-President, Mr. R. G. Haig as Hon. Treasurer, and Mr. J. R. Y. Goldstein as Hon. Secretary. The ballot for five members of Committee was in favour of Messrs. Allen, Bale, Barnard, Blackett, and Rev. A. Creswell.

The President then read his annual address, which was of great interest, and will appear in the journal of the Society. Our abstract of the address is unavoidably crowded out.

ROYAL SOCIETY OF SOUTH AUSTRALIA.

The annual meeting of the Royal Society of South Australia took place on Tuesday evening, October 4, in the Institute, North-terrace. His Honor the Chief Justice presided. There was not a large attendance—probably because the meeting was not advertised. Several books of donations to the Society were laid on the table. Dr. Stirling was elected as a Fellow of the Society.

Professor Tate referred to a pond snail obtained by Mr. S. Smeaton, in the Reed-beds. It belonged to a species that he had already described from the shell under the name of *Limnea papyracea*. There were other pond snails under another generic name, and those he had found alive were *Limneæ*. The one under notice differed in the extension of the mantle covering the entire shell, and belonged to *Amphipeplea*.

Mr. F. S. Crawford stated that he had been experimenting with a view to see whether there was any truth in the belief that the dande-

lion pollen caused what was known as the dandelion fever. The result of his experiments was that in his opinion the pollen did not float in the air, but was carried by insects, as the dandelion belonged to the order of plants which insects sought for the honey, and it did not trust to the air for extending its fertilizing powers. He covered the microscope slides with paper, leaving a hole, and coated the vacant space with glycerine and spirits of wine; put some of them on posts, and carried others, exposing them to the air where the dandelion grew plentifully, but of twenty-eight exposed in that way not one showed a deposit of pollen of the dandelion, which was so well marked that it could not be mistaken.

The following officers were elected for the ensuing year:—President, His Honor the Chief Justice; Vice-Presidents, Messrs C. Todd, C.M.G., and D. B. Adamson; Hon. Treasurer, Mr. T. D. Smeaton; Hon. Secretary, Mr. W. Rutt; Members of the Council, Professor Tate, Dr. Mayo, and E. C. Stirling, M.D., and Mr. F. Chapple, B.A., B.Sc.

ANNIVERSARY ADDRESS.

Professor Tate delivered the anniversary address, taking for his subject "Geology in its Relation to Mining, Subterranean Water Supply, in South Australia." In his introductory remarks he deplored the incompleteness of his personal observations, and said it could not be supplemented within the short time allowed for the preparation of the address. He spoke of geology as an inductive science, and of its practical utility, and urged the necessity of commencing a geological survey, remarking—"That perhaps at no time in the industrial history of the colony could we have realized the value of a systematic geological survey more than at the present." The geological distribution of gold was restricted to the pre-Silurian strata, and to the gravels of the Miocene and latter tertiaries—in the first as reef gold, in the latter as alluvial gold. He directed attention to the stratigraphical position of the chief repositories of reef gold, and to the interlamination of quartz in the mica schists, which had been found to be auriferous and had been mistaken for true reefs. He argued the question of the distribution of reef gold in depth, and compared that colony and Victoria as to the facilities and chances for prospecting for, and of the existence of, remunerative gold reefs, and explained why the Victorian experiences were not applicable in judging of the chances of similar quartz reefs occurring there. Our reefs, he said, differed in character and in geological relations. He argued that the knowledge of certain facts respecting the character of quartz reefs might be profitably applied in bringing about a better method of preliminary exploitation of veins than was now pursued, and considered that a misdirected energy in the conduct of investigations was a more fruitful source of failure in our gold mining ventures rather than attributable to a low percentage yield of gold. We wanted a better class of men as mine managers. He suggested that, for the present, gold companies contribute among themselves for the services of a consulting mine engineer. As might be expected, the present activity had brought to the front unscrupulous men, who succeeded in deluding the ignorant. He quoted many misleading statements which appeared

in print in the last few weeks, and pointed out the fallacious reasonings contained therein. He had no intention of charging the authors with wilful deception, and had no desire to disparage honest, studious thought; but he must point out the necessity of balancing honest thought with a due weight of honest facts. The remedy was an educated public opinion, and he expressed regret that the daily Press should retard the attainment of that object by reprinting statements of a pernicious tendency in implied approval. In respect to the distribution of alluvial gold, the sources of the gold were considered, and in this connection the aid the geologist could render to the gold prospector was commented upon. In regard to the search for petroleum the author stated that we had been led to believe that subterranean stores of petroleum existed in this colony, from the fact that spurious substances met with at the surface at several distant parts had been regarded as having an origin in common with petroleum. In all cases of reported discoveries the petrological associations had been adverse to the petroloid nature of the materials, whilst chemical investigations had dispelled any hope of their value as sources of petroleum, which might have been fostered by their external appearances. He named many of those spurious substances which had been submitted to him. After discussing the nature and origin of petroleum, he showed how hopeless it was to search for petroleum in our pre-Silurian strata, and more particularly in those highly metamorphic strata in which prospecting was being carried on in one or two places in this colony. The possibility of sources of petroleum being found in the tertiary strata was next referred to. He then gave a short review of the circumstances connected with recent reputed discoveries and indications of coal. Here the author followed the same line of argument, and narrowed down the limits within which a search for coal might be prosecuted, with a vague probability of a satisfactory result. The alleged discoveries were of true coal, but not obtained *in situ*, as might be proved from a glance at the geological map, even in those cases where it might not be possible to get at the true facts as to how it had come there. The feasibility of obtaining water in regions destitute of permanent surface-water, which was acknowledged to be of the greatest importance, was declared to be a question for the skilled geologist, whose operations in the future would be materially assisted by records of well-sinkings. He referred to the endeavours of the Society in this direction, and declaimed against the interference of the Chamber of Manufactures in the work initiated by the Society. He discussed the whole question of our great natural water resources, treating first of that derived directly from the rainfall, explaining the origin of our salt lakes, and offering practical suggestions as to the best mode of impounding waters in arid regions. In the second place, he detailed the circumstances attending the underground storage of water, explaining the origin of the diversity in quality and quantity of waters derived from the Pliocene drifts. He then reviewed the main facts influencing the outflow of water from the pre-Silurian strata. Lastly, he referred to stores of water not derived from local sources, such as that which underlies the Murray Plain from the river to the Victorian frontier, which, from the facts submitted, he inferred to arise from the percolation of the Murray waters.

Another store was that indicated by the existence of the "mound springs," which were natural artesian wells. Touching the source of the supply, he had good reason for the opinion that it was derived from tropical rains to the north-east (about) of Lake Eyre. The importance of tracking the direction of this subterranean flow by a series of bore-holes was strongly urged; as, if such existed, and in the direction indicated, then access to and the development of reputed good pastoral country would be assured to us.

A vote of thanks was accorded to Professor Tate for his address, and it was decided that it should be printed with the transactions of the Society.

NEW ZEALAND INSTITUTE.

WELLINGTON PHILOSOPHICAL SOCIETY.

The above society held a meeting at the Museum on September 17th, Dr. Hector, F.R.S., President, in the chair. The meeting opened with the discussion on Mr. Travers's paper "On the Great Flood in North Canterbury in 1868," which was read at the previous meeting.

The President explained, for the information of those who had not been present when the paper was read, that the chief points brought forward by the author were that the flood referred to was of such magnitude as had probably never occurred previously in the particular locality, and had been so destructive as to alter the surface features of the country, thereby leaving a permanent record of its severity.

Mr. Chapman agreed that the flood in question was exceptional, but there was not sufficient evidence brought forward to prove that such had not previously occurred—indeed, he believed there had been quite as severe floods in the south and west, but not doing such damage, probably because the rivers in those localities were better adapted to carry off such heavy rains. Such a flood as the author described would on the West Coast have been unimportant.

Mr. Marchant had surveyed that block of country, and believed that the destruction of the timber had a baneful effect in increasing the rapidity with which the storm water ran off the mountains. He instanced the case of the Rimutaka and Tararua ranges, and stated that if the clearing of the forests was continued, the result would be the scouring out of all the valuable lands in the Hutt and Wairarapa valleys. Bush reserves were now being made to avert this disastrous result.

Mr. Cox took exception to the geological reasoning in the paper, and thought that the proofs of this flood being of an unexampled character were not sufficient.

Mr. Travers, junr., mentioned the floods in the Motueka district, in 1876, which were caused by land-slips damming the rivers, so that the hill-sides were cleared of timber, and the driftwood thickly covered the sea in Blind Bay.

The President, before calling on Mr. Travers to reply, remarked that he thought the paper was one of great importance to those in

charge of public works that were proposed, especially in this particular district. He had since last meeting looked up the meteorological records for the period when this flood took place. These early records were not so complete as those now made, but he had obtained sufficient proof of the passage over the middle part of New Zealand of a great atmospheric depression, from the 2nd to the 4th February, 1868, and that the centre passed N.E. of that part of the Islands which suffered most, which fully accounted for the unusual direction of the wet wind which came from the eastward. The depression revolved round a low pressure of 28.6, and by means of a diagram he showed reasons for believing that it reached New Zealand from the tropical parts of the Pacific Ocean lying to the N.E. of New Zealand, instead of having had the more common course from the westward. The translation of a mass of warm and moisture-laden tropical air to higher latitudes, and its impingement on the eastern flanks of the New Zealand mountains, sufficiently accounts for the extraordinary character of the flood.

Mr. Travers, in reply, thought that it was immaterial to attribute the effects he had described to land-slips—these were an effect and not a cause. The fact was that the rain was so great that the river channels could not carry the waters. It was during the first few hours that the rivers rose most rapidly. All the driftwood was dead, and seemed to have been the accumulation of years. The flood was not by any means local, as the Hutt River also brought down driftwood, so as to cover the whole harbor and discolor the sea outside the Heads for two miles for several days. Mr. Cox, he thought, misunderstood his argument, as the accumulations of detritus formed during the flood were entirely new at that date, and now form permanent objects in the district. Such a flood could never have occurred before, or similar marks would have been left. He gave further particulars respecting the whirlwinds mentioned by Mr. Bull, and stated that large tracts of forest in the Nelson district had been completely overthrown by them.

2. Notes on the Mineralogy of New Zealand, by Mr. Cox, F.G.S.—This was the first of a series of papers describing all the minerals which had been met with in New Zealand, and dealt with titanium, chrome, and manganese ores, giving interesting particulars of the mode of their occurrence and the uses to which they can be applied.

3. Description of further new species of alpine plants from Otago, by Mr. J. Buchanan, F.L.S.

4. On the occurrence of the sea trout (*Salmo Trutta*) in Nelson Harbor, by Dr. Hector.—The fish exhibited was sent by Mr. Greenfield, the Secretary to the Acclimatisation Society, as being perhaps a specimen of the Californian salmon. It was caught in Nelson Harbor, near the mouth of the Maitai stream, another specimen having been caught a few days previously. Californian salmon having been turned out some years ago in the rivers of the Nelson district, while no other migratory salmon had ever been liberated north of Otago, it was not unnatural to suppose that it might be the first return of the Californian salmon. It, however, proves, on examination, to be a true sea or salmon trout. The specimen is a female that has just completed depositing her spawn; its length is 25in, and when in good condition it



THE
SOUTHERN SCIENCE RECORD.

MELBOURNE, DECEMBER, 1881.

SHELLS:

What they are, their structure and uses, how and where to collect them, with some account of their inhabitants.

By J. F. BAILEY.

[Read before the Field Naturalists' Club of Victoria 10th October, 1881]

PART I.

I hoped ere this that some one better able, and with more time, than myself would have taken up the subject of shells: as they have not done so, I now venture to offer some papers on this subject. In the series of papers to be given, it is not my intention to follow up the different genera, or to enter into each class, but to give some discursive papers, more especially directed to those who have not given a thought to the beautiful objects which have been termed by Mantell "The Medals of Creation."

Shells have long excited interest. In many a humble home may they be seen; while in the habitations of a higher order they often appear as the result of a choice directed by intelligence and taste. Many a specimen is associated with the remembrance of a delightful search on the sands when the tide has gone out, of intercourse which gladdens and improves the heart, and of scenes which have left impressions on the mind not to be effaced, showing what interesting materials for conversation might be found were an acquaintance with this circumstance more general. The word "scell" is derived from the Saxon "scell." A great many meanings have been given for the word. Dr. Johnson gives us no less than eight: first, he calls it the hard covering of anything; second, the covering of a testaceous, or crustaceous animal. The word "testaceous" is derived from the Latin, *testa* (having a shell), and means consisting or composed of shells. So testaceology is the science of shells; synonymous with Conchology, which relates not only to shells, but also to their inhabitants. A shell is the calcaerous, substance which protects either partially or entirely the testaceous mollusks externally, or supports certain of them, such as the cuttle fish, internally. Shells are either crystalline or granular. Crystalline shells are those which have more or less of transparency, so that if held up against the light it shows through them; the cowries are shells of this description. They are sometimes called porcellanous, from their resemblance in this respect to chinaware: a good example is the *Ovulum ovum*, commonly called the porcelaine egg-shell. The animal matter, which unites with the carbonate of lime, is more equally blended with the earthy particles, to which it appears to act as a cement, binding them strongly together. In shells of this description,

must have weighed over 6lbs. The stomach contained a small barracouta and a sea-mullet. About 70 salmon trout, obtained from Tasmania, were turned out in a river in Otago in 1870. They are now common in Dunedin Harbour, and, it would seem, are spreading all round the coast of New Zealand. This affords a most extraordinary instance of the rapid increase and extension of a species over a large area.

Mr. Travers said he had reason to believe that similar fish occurred in the lower part of the Hutt River.

Several papers were held over, and the meeting adjourned until the 1st October.

ON THE STAR LACAILLE 2145.

BY JOHN TEBBUTT, F.R.A.S.

[Read before the Astronomical Section of the Royal Society of N.S.W.,
July, 1881.]

This is to be found in the catalogue contained in *Crossley Gledhill, & Wilson's Handbook of Double Stars*, but no hint is there given as to its variable character, although both components are set down as of the eighth magnitude. The earliest record I can find is that of Lacaille, who observed it as a single star of the sixth magnitude. The next record is that in the Brisbane Catalogue, where it is numbered 1137, and stated to be of the same magnitude. In the *Handbook* just cited, there is given a list of measures, by Dunlop, J. Herschel, and Jacob, from which I select the following as showing the change in angle and distance of the components in the interval:—

Observer.	Epoch.	Angle.	Distance.
Dunlop	1826.00	329.0°	3.00"
Herschel	1835.02	342.5°	3.86"
Jacob	1846.94	348.5°	3.22"
Jacob	1858.17	354.7°	2.18"

My attention being directed to this star, both by the recorded change of angle and distance, and by the statement of its magnitude, I turned the 4- $\frac{1}{2}$ -inch equatorial on it in March last. Owing, however, to the small power of the instrument, the fact that it was not driven by clockwork, and the closeness of the components, I found it a difficult object for measurement. The following are the results:—

Epoch.	Position—Angle.	No. of Obs.	Distance.	No. of Obs.
1881.214	12.7°	9	2.50"	5
1881.219	10.1	12	2.42	4

The distance is probably somewhat too great, but it is quite obvious that the small star has passed the meridian of its primary. My own estimates of the magnitudes of the components were $8\frac{1}{4}$ and $8\frac{1}{2}$, and it is quite certain that Lacaille's small telescope could not have exhibited either of them under such conditions. The star is therefore certainly a variable, and probably a binary, and under these circumstances I think it would be an interesting object for the large equatorial of the Sydney Observatory.

the carbonate of lime assumes more of a crystalline arrangement, the minute crystals being sometimes in the form of rhombs and sometimes in that of prisms. They are, in the former case, composed of three distinct layers, each of which is formed of very thin plates, marked by oblique lines, which show the direction of the crystalline fibres so arranged as to give strength to the shell, and, what is more remarkable, on a principle laterly applied to the building of ships. These plates are like a pack of cards placed on edge, each plate being composed of prismatic cells; and, the direction being changed in successive plates, they cross each other at right angles.

In *Cyprea*, *Cassis*, and *Bulinus*, the central plates are transverse, and lengthwise in the inner and outer layers. In *Conus*, *Oliva*, and *Voluta*, the centre plates are longitudinal, and transverse in the inner and outer layers. These strata or plates separate easily in fossil shells: eocene fossils best exhibit this structure, as they have not undergone a re-arrangement of their particles like the paleozoic species.

Granular or concretionary shells are the most hard and compact: the commonest form is the oyster shell; broken across it will be seen to consist of very thin plates or laminae, as they are termed, closely packed together, and are caused by the alternate layers of very thin membrane and carbonate of lime; but this alone does not give the pearly lustre which we term "mother of pearl;" it is caused by the peculiar thinness, transparency, and regular arrangement of the outer layers of membrane, which, in conjunction with the particles of lime, enter into the formation of that part of the shell which we call pearl: the thinner the laminae may be, the more lustrous will be the lining of the shell, the shifting play of colour which we call iridescence from "Iris," the rainbow, being then most noticeable, each layer being $\frac{1}{7740}$ of an inch apart. The same shining property can be given to sealing-wax, gum-arabic, etc., by taking an accurate impression of mother of pearl. There are two shells that show this shining property to perfection, the mother of pearl shell, *Meleagrina margaritifera*), and the beautiful *Pleiodon ovata*, specimens coated and uncoated. Who would expect to find such a beautiful lining to such dingy looking shells; and the most curious part of the matter is, that from the juice or fluid of their own bodies, and from the chalky matter collected from the water, they are enabled to secrete or deposit such wonderfully constructed habitations, which, after all, are little else than chalk. Burn a heap of oyster shells, and we get lime, the same as that produced by burning lumps from the chalk-pit.

TO PRESERVE STAR-FISH.

Kill by immersion suddenly in a solution consisting of equal parts of fresh water and muriatic acid. This kills immediately, so that a "brittle star" has not time to dismember itself. When killed, wash several times in fresh water to remove all traces of the acid. Then place between boards, turning repeatedly for a few days, and dry in the sun.

J. F. BAILEY.

November, 1881.

TRANSIT OF MERCURY, NOVEMBER 7-8TH, 1881.

The meteorological conditions were very favorable here for the observation of this important phenomenon. The contacts were observed with the full aperture of the $4\frac{1}{2}$ -inch equatorial furnished with Cooke's diagonal prism and a negative eye-piece of 120 diameters. The field-lens was smoked, and a shade of a brownish-green colour was fitted on between the eye and the eye-lens. By this combination the Sun's limb was of a straw colour and the sky dark. The steadiness and definition of the objects were such as to admit of very accurate determinations of the contacts. Unfortunately, however, I was some seconds late in catching the first external contact, the notch in the solar limb being very marked when first seen. The three other contacts were exceedingly well observed. There was no black drop, no shadowy ligament like that observed at the transit of Venus in 1874, nor was I troubled with the triangular black ligament seen by me at the egress of Mercury in May, 1878. The following are the observed phases in local mean time:—

				D.	H.	M.	S.
First external contact	...	...	...	Nov.	7	20	43.3
First internal contact	...	...	...	"	7	20	22 9.8
Last internal contact	...	...	...	"	8	1	38 57.5
Central bi-section	...	...	...	"	8	1	39 43.5
Last external contact	...	...	...	"	8	1	40 36.5

I believe the internal contacts as above given were as nearly geometrical as can possibly be observed. The geometrical contact is a theoretical rather than a practical matter. The formation or the rupture of the line of light between the limbs can hardly be an instantaneous phenomenon. In the present case this line, notwithstanding the steadiness and good definition, brightened up or faded so gradually that it was impossible to determine within two or three half-seconds of the chronometer what was the precise instant of its formation or disappearance. At the ingress two or three rapid undulations of light occurred between the closing cusps, and the thread of light was at once established: six and a half seconds later, or at 20h 22m 16.3s, the band of light had become very distinct. At 1h 38m 54.5s the line of light at egress was very fine; three seconds later it was broken, and the contact was certainly complete. Every precaution was taken to secure correct mean time. Good transit observations were obtained on the evenings preceding and following the phenomenon, and a transit of Regulus was also observed shortly before the ingress. Notwithstanding a careful examination the planet could not be seen, when off the Sun's disc, owing, probably, to filmy clouds which overspread the sky. There was no halo round the planet, nor was there any trace of a satellite. A faint whitish spot was, however, occasionally seen on the planet's disc, and the disc itself was not always perfectly black. At times it seemed to reflect a very faint greyish light. The Sun-spot phenomena on the day of the transit were exceedingly interesting.

JOHN TEBBUTT.

Observatory, Windsor, New South Wales.
November 14th, 1881.

NOTES ON THE LEPIDOPTERA OF JAPAN.

By F. C. CHRISTY.

[Read before the Field Naturalists' Club of Victoria 13th June, 1881.]

PART. III.

ARCTIA CAJA*—(The garden tiger moth).—Caja feeds upon the dumb nettle (*Lamium*). The larvæ are abundant, but most difficult to rear; although identical with the British species, its habit is different; it does not form its cocoon upon the bark of trees or fences like the English, but spins scarcely any web amongst the roots of the *Lamium*; from hundreds of larvæ I never reared one *Imago* in a perfect form, being all more or less crippled in their wings, hence the perfect insect is comparatively rare.

EUTHEMONIA RUSSULA*—(The clouded buff).

MILTOCHRYSTA MINIATA*—(The red arches).

ARCTIA is represented by several beautiful species not agreeing with any of the English, but one closely allied to *Villica*.

LITHOSIA OMPLANA*—(The common footman).

LITHOSIA QUADRA*—(The four-spot footman). Several other species more or less closely allied or identical with the British.

TRIPHENA—(The yellow underwing)—are almost without a representative: this is strange, as the genus is so largely and widely diffused through England and Europe.

LYTÆA—Are all represented.

CHAREAS—

RUSINA—

AGROTIS—Most of the English species are found in Japan.

AGROTIS SGETUM*—&c.

GRAPHIPHORA—Many species of this are common and probably identical with the European species, but this and the preceding are difficult to identify without exact comparison.

SEMIPHORA—The species appear to be identical in many instances.

ORTHOSIA—

MYTHIMNA—Several of the species identical with the British.

SEGETIA—Apparently identical with the English species.

CARADRINA—

GRAMESIA—

DASYCAMPA—Apparently the same as the British species.

GLEA—

MEEOPTERA—

AMPHIPYRA PYRAMIDEA*—(The copper underwing).

PYROPHILA TRAGOPOGINIS*—(The mouse).

LEMURIS TYPICA*—(The dark gothic).

XYLINA—Both represented, two species taken of *calocampa*, closely allied if not identical with the British.

CALOCAMPA—

XYLOPHASIA—

Not identified.

- HADENA — Several species.
 HELIOPHOBUS— Represented by species, but not positively known
 to be British species, lucipara apparently identical.
 EUPLEXIA — " " "
 HAMA — " " "
 MAMESTRA— Several species.
 BRASSICÆ*— (The cabbage).
 PERSICARIÆ*— (The dot).
 APAMEA — Not identified, but doubtless represented.
 MIAMA — " " "
 CELCENA — " " "
 TRACHEA — Not taken whilst I was in Japan.
 VALERIA — " " "
 MISELIA — " " "
 POLIA — Not any of this group taken.
 APATELA — Not identified.
 BRYOPHILA— "
 DIPHTERA — "
 THYATIRA BATIS * — (The peach blossom).
 THYATIRA DERASA*— (The buff arches).
 SCOLIOPTERYX LIBATRIX*— (The herald).
 ACRONYCTA PSI*— (The dagger moth).
 ACRONYCTA TRIDENS*— (The dark dagger moth). Doubtless other
 species of this family have been taken, but not identified
 British.
 CERATOPA DILUTA— Apparently identical with the British species.
 CERATOPACHA— " "
 PLASTENIS— Not identified.
 CLEOCERIS— "
 COSMIA—Several species.
 COSMIA DIFFINIS— Believed to be identical with the British species.
 XANTHIA — Several species, believed to be identical with the British
 species.
 FLAVAGO— " "
 ORBONA— " "
 GORTYNA— " "
 NONAGRIA—Several species closely allied, if not identical with, the
 British species.
 LENCANCIA— " "
 PILOGOPHORA METICULOSA*— (The angle shades).
 CUCULLIA — Several species, not positively identified as the British
 species, but apparently the same.
 CUCULLIA LETUCÆ— Imago and larva apparently identical; the larva
 is abundant upon the Sowthistle—(*Sonchus*).
 CHARICLEA— Not identified.
 CALOPHASIA— "
 EREMORHA— "
 ABROSTOLA ASCLEPIADIS— Appears to be identical with the British.
 PLUSIA — Most of the British species have been taken and identified.



PLUSIA AURIFERA—Are represented by beautiful species, but the golden bars are differently placed, being apparently new species.

PLUSIA CHRYSITIS—

HELIOTHIS MARGINATE*—

HELIOTHIS PELTIGERA*—

HELIOTHIS DIPSACEA*—

ANARTA—Species taken, probably some agreeing with the British.

HELIODES—

ACONTIA—

EUPHASIA—Not positively identified.

PHYTOMETRA—

ACOSMETIA—

STILBIA—

OPIHUSA LUSORIA*—(The black-neck).

MORMO—(The old lady)—There are an immense number of most lovely species, which will probably be divided into several groups; in fact this is one of the most beautiful and extensive groups of the *Lepidoptera* of Japan, but the British species *Maura* has not been taken.

CATOCALA FRAXINI—Has not been taken, although the country abounds with the European Ash—(*Fraxinus excelsor*).

CATOCALA NEPTA*—(The red underwing)—Several smaller crimson underwings have been taken, and probably some of them will be identical with the British species.

BREPHA—Species of this group have been taken. Appears to be the British species.

EUCLIDIA GLYPHICA—

Numerous beautiful genera have been taken, as yet unclassified and unnamed; one in particular has been named, but unfortunately I have forgotten the name; the larva is green, spotted with black, and has two long filamental appendages on the upper part of the body attached to or near the thoracic segment; the larva feeds upon the wild privet, which shrub appears to be identical with the wild privet of England (*Ligustrum vulgare*).

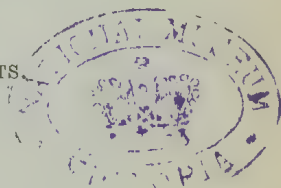
As this paper has become very lengthy, the *Geometridæ*, *Pyalidæ*, &c., cannot be referred to, but very many British species in each of these divisions have been recognised. The *Geometers* and *Pyrales* are extremely numerous and beautiful, especially the *Pyrales*; the number of species is enormous, and as beautiful as extensive. The number of species of *Geometers* is also very extraordinary, and some species are very beautiful and large, as the large green *Emeralds*, *Boarmias*, &c. Very many of the British species have been taken. It is very remarkable that so many of the British species of *Lepidoptera* should be indigenous to Japan, because Japan is composed of islands unconnected with any continent. This fact becomes more singular, as the continent of China is as near, or perhaps nearer, than the Russian frontier; and in China, I believe, few if any British species are found,—that is, I only speak from a large collection of *Lepidoptera* taken in China, amongst which I did not observe one British species. Supposing the British species to have been diffused from one focal point or centre,

and to have travelled, either way, to England or Japan, then, to maintain the same climatic range, they must have travelled between the fortieth and fiftieth parallels of latitude. It is worthy of note that most of the British species are found on the north of the main island, or on the northern island consequently, within a few degrees of the same latitude as England. The conclusion, I think, that may be drawn is, either that these insects have been diffused, through the same latitude, the enormous distance of 12,000 miles, or they *must have had an origin* in each island, England and Japan. If the latter be correct, it would strengthen the theory that Creation was more extensive, and that species have died out on portions of the globe, and have remained where the climate has been propitious. It is hardly possible that the theory is correct of one species producing a number of species from passing through vicissitudes of life and climate, and that when these branch species reach the extremities of the Globe under the same climatic influence, pass gradually back to the original species: this theory is in accordance, I think, with the Darwinian theory. It would be very interesting if a few of the British species of insects could be discovered in Australia and proved to be identical. It matters not to which class the insects belong, the fact would be equally important. By "class" I mean division, such as Lepidoptera, Coleoptera, &c. It would go far to disprove the idea that one species may be so altered by climatic influence, &c., that it becomes a new species and *remains a permanently distinct species* so long as it exists within that climatic range, *but alters* back to the original species from which it branched as it is removed from that particular climatic influence to its original climate.

VICTORIAN FERNS AND THEIR HABITATS.

BY C. FRENCH.

PART V.—(Continued).



[This part of Mr. French's paper was crowded out of last issue.]

Doodia—(R. BROWN).

Rhizome, tufted; sori, oblong or shortly linear, scabrous; ferns, often small.

Doodia caudata—(R. BROWN).—A very pretty and well known little fern, found growing in many of our fern gullies throughout the colony. This genus is somewhat of a local character, as you may search in vain for it in some gullies which contain many of the more gregarious kinds. I have found it growing in great quantities in some of the gullies near Cumberland Creek, on the Wood's Point road, about seventy miles from Melbourne. Years ago you might find it in many of the Dandenong gullies, but now it is confined to a few of the less frequented spots, such as Sassafra and other back gullies. As a plant for cultivation, it is of little use excepting for Wardian cases

and small ferneries. To grow it well, it should be potted in very filmy soil, and should be kept well watered. There is a larger variety, which is found in Queensland, called *D. media*, but this seems to me a very different plant. A few months since, I have recorded from Beechworth a very pretty crested form of this fern, which would be well worthy of cultivation. It was sent to me by Mr. Harper, of the Beechworth Asylum, a gentleman who has paid some attention to fern collecting, and to whom I am indebted for many rare specimens and valuable local information. According to Bentham and others, it is also found in Queensland, New South Wales, Tasmania, New Zealand, and in the South Pacific Islands. Height, from 6 inches to 1 foot.

Doodia aspera.—(R. BROWN).—This is also a well-known fern, and may be found growing in quantities on the banks of creeks and rivers, &c., often in soil of basaltic formation. In appearance it differs considerably from *D. caudata*, by being more rigid, a darker green in colour, and very crisp to the touch. It is of little use for cultivation, excepting that it helps to complete a collection of hardy indigenous kinds, as it is very easily burnt by the rays of the Sun, or dried up by a hot wind. On the shady banks of the Upper Yarra and its tributaries this species seems to be quite at home, and the fronds often attain a length quite unheard of in more exposed places. To grow it successfully, it should be planted in a pot well drained, in soil composed chiefly of skimmings from basaltic rocks. Height, from 6 to 18 inches. Found also in Queensland and New South Wales. I may observe that this genus approaches very closely that of *Woodwardia*, in fact the fructification of the two genera is so much alike that it is difficult to separate them.

PROCEEDINGS OF SOCIETIES.

THE ROYAL SOCIETY OF VICTORIA.

The ordinary monthly meeting of the members of the Royal Society of Victoria was held in the Society's hall on Thursday, Nov. 10. The President (Mr. R. L. J. Ellery) occupied the chair.

Messrs. W. J. Daly, of Onitchambo, and W. H. H. Lane were elected members of the Society; and Messrs. C. Rowan, A. A. Slater, and W. H. Finney, as associates.

The Chairman said that Mr. W. W. Culcheth's paper on the above subject, which was read at the last meeting of the Society, was before them for discussion. In accordance with the resolution passed at the last meeting, an invitation had been sent to Messrs. Gordon and Edwards, the authors of the prize essays, to be present, but they had replied stating their inability to attend.

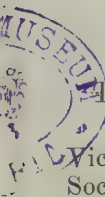
Mr. W. C. Kernot, as one of the members of the board appointed to review the various essays sent in, said that of course he could not

divulge what took place at the private sittings of the board, but he did not think he would be going too far in saying that the board, in recommending Messrs. Gordon and Edwards' scheme for the prize, did not take upon themselves the responsibility of saying that it was practical, but only that it was the best of the schemes submitted to them. In his opinion, before any scheme for the drainage of the metropolis was finally decided on, it would be necessary for more elaborate inquiries to be made to ascertain the levels, &c. The initiatory steps having been taken for the adoption of a scheme of sewage for Melbourne and suburbs, the subject was open for discussion, and he wished it to be understood that the board did not regard the prize scheme as perfect. Mr. Kernot then briefly referred to some of the objections to the scheme raised by Mr. Culcheth in his paper, dwelling particularly on the site selected at Sandridge for the filtering area. The land, he thought, might eventually be required for building purposes, docks, &c., and the question, to his mind, was, whether it would not be advisable to select a site further away, either at Wellington Plains or Lavender Bay. Another question of importance was the disposal of nightsoil.

A general conversational discussion ensued, much attention being paid to the latter question, viz., the disposal of the nightsoil, the point at issue being whether the present system should be continued, or whether water-closets with traps should be introduced. One objection raised to the latter system was the fear of the sewage gas coming up, but this, it was argued, could be averted by the use of double traps with ventilation pipes. On the question of cost being raised, it was stated that the present cost of removing nightsoil for Melbourne alone was £5,200 per annum, and, reckoning the surrounding municipalities at the same rate, it was thought that the closet and water system could be carried out at about the same expense. No decision was arrived at by the meeting, the members present being of opinion that, before anything was done towards carrying out sewage works for Melbourne and suburbs, it would be necessary for a complete survey to be made, and all the levels properly taken.

The Chairman stated that Dr. M'Gillivray had promised to read a paper entitled "Descriptions of New Polyzoa," and exhibit specimens of all the Victorian species of *Membrenipora*, but as he was unable to attend, it would be postponed.

The meeting then terminated.



THE FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Field Naturalists' Club of Victoria was held on Monday evening, the 14th inst., at the Royal Society's Hall, there being the usual good attendance of members, and Mr. J. R. Y. Goldstein, one of the Vice-Presidents, occupied the chair.

Messrs. Thomas Hyland, Joseph De Drew, R. J. Talbot, and Jas. Scott, B.A., were duly elected as members, and one additional nomination received for next meeting. The Librarian reported the Library to be making steady progress, the following contributions having been

received, and for which the Club's thanks were duly accorded, viz.—Reports of Dunedin Field Naturalist Club, years 1879-80 and 81; Nos. 1, 2, and 3, of Journal of Microscopical Society of Victoria; Papers on some Birds and Shells from Solomon Islands, also notes on some recent Mollusca found in Port Jackson, and list of Cypreæ from Moreton Bay, by Mr. J. Brazier; First Book on Australian Botany, and A B C of Botany, by Mr. W. R. Guilfoyle. Mr. J. F. Bailey read the first part of a contemplated series of papers on Shells, giving a most interesting account of their process of growth, pointing out the distinction in the various genera and species, and illustrating his explanations by some very fine specimens. Equally interesting was the second portion of Mr. J. R. Y. Goldstein's "Elementary Studies in Biology," describing and illustrating the life history of the Yeast plant (*Torula*) and of the *Protococcus*, a green plant very common in almost any stagnant pool or on any damp wall. Both papers were most attentively listened to throughout, and Messrs. Bailey and Goldstein are to be complimented for affording those present a most agreeable and instructive evening's entertainment. For the next meeting, in addition to those already promised, Mr. D. Sullivan, of Moyston, will contribute a paper on the *Epacridæ* of the Grampians.

Amongst the exhibits were some Bryozoa and Sea-weeds from Queenscliff, shown by Dr. Lucas; series of microscopic Fossils, consisting of 12 slides of foraminifera and 23 of microscopic Mollusca from the oligocene beds of Mount Martha, by Mr. H. Watts; Coleoptera, from the You Yangs and Pakenham, by Mr. J. E. Dixon, including *Aphneope sericata*, and *Amphirhoe decora*, Longicorns, and *Chrosis illita*, Elater; also, supposed new Buprestis and Longicorn, the latter being a *Uracanthus* somewhat resembling *U. triangularis*, but being much more hairy on the elytra, and the markings not being so distinct. Both these specimens were from the You Yangs, and were taken on the occasion of the Club's excursion there on 1st Nov. Three species of Black Cockatoo, by Mr. T. A. F. Leith, viz., *Calyptorhynchus funerus*, or funeral cockatoo, *C. baudini*, or Baudin's black cockatoo, and *C. naso*, or Western Black cockatoo. By Mr. C. French, Queensland Scorpions, a rare Longicorn, *Tragocerus formosus*, from Cape York; a new species of Buprestis, *Chrysochroa bomanensis*, from Sumbawa, and only recently described, and a very rare Buprestis, *Catoxantha nigricans*, from Assam; also, by Mr. D. Best, Coleoptera taken during the present month of November.

The usual conversazione brought a most enjoyable meeting to a conclusion.

THE MICROSCOPICAL SOCIETY OF VICTORIA.

The Microscopical Society of Victoria held an ordinary meeting on Thursday, 24th Nov. Dr. Ralph, President of the Society, occupied the chair. An interesting paper, by Mr. W. A. Wooster, was read on "Superstage reflex Illumination," which gave rise to considerable discussion, so that a second paper, by Mr. W. T. Mofatt, had to be postponed.

ROYAL SOCIETY OF SOUTH AUSTRALIA.

A meeting of the above Society was held at the Institute on Tuesday evening, November 1. The Chief Justice occupied the chair, and about twenty members were present. The Secretary read the following list of donations to the Society:—Legislative Council Papers, from the Government of Tasmania; Proceedings of the Linnæan Society, vol. 6, part 2; Handbuch der Königl Preuss.; Geolog., Gessellschaft; Southern Science Record, Nos. 10 and 11; Australasian Medical Gazette, No. 1; Census of Victoria, tabulation: and several writings by Mr. John Brazier, and the South Australian Institute report for 1880-1. Dr. Florance and Messrs. W. H. Tietkens and M. Salom were elected Fellows of the Society, and Messrs. J. C. Cloud and J. Chandler were elected corresponding members.

The Chairman introduced Professor Custance as a visitor to the meeting, and stated that Mr. Waterhouse had sent for exhibition some eccentric forms of starfish found at Port Vincent. There were also shown some English humble bees and their nests, imported by Dr. Mayo, but which had unfortunately died on the voyage out, this being the second unsuccessful attempt made by Dr. Mayo to introduce them into the colony.

Mr. Crawford exhibited two samples of different species of coccidæ, one of which was peculiar from its resemblance to a cluster of berries, and was found growing on an acacia. The other species came from the banks of the Torrens, where they were rapidly destroying the young gum-trees. They appeared to be provided with two pairs of eyes each, which were perfectly discernible under the microscope.

Professor Tate stated that the Society had received from Mr. Moncrieff a fragment of the lower jaw of one of the large extinct marsupials found at Islington. Mr. Tepper had found interesting fossil remains of a trilobite near Ardrossan. He (Professor Tate) had found, near Golden Grove, *Quinetia Urvillei*, a plant not previously discovered in South Australia, though common in Western Australia, and which was probably indigenous here, not imported from the latter colony, as Baron von Müller surmised. Mr. Horn had sent an exhibit of a caterpillar, out of whose head was growing a stalk, a species of fungus which fed on the juices of the caterpillar until they were utterly exhausted, just when the fungus had attained maturity. This was a native of New Zealand.

Mr. C. A. Wilson asked the Chairman what was to be done with the specimens lying on the table. The Chairman replied that those belonging to the Society would be disposed of by the Council, while those that were lent by gentlemen to the Society would be returned to them.

The discussion on Professor Tate's annual address was further postponed until the paper should have appeared in the daily Press.

Mr. Todd, C.M.G., then read the following paper on "The Transit of Mercury:"—"I wish to call the attention of the Society to the transit of Mercury on Tuesday next, the 8th inst. The orbit of Mercury is inclined to the plane of the ecliptic a little over 7° ($7^{\circ} 0' 8''$). The longitude of its ascending node is $46^{\circ} 33'$, and descending node $226^{\circ} 33'$ —positions occupied by the Sun in May and November re-

spectively. A transit of the planet can, of course, only occur when it is at or near its ascending or descending node at the time of its inferior conjunction, that is, between us and the Sun. When, therefore, the transit occurs in May, the planet is at its descending node, and in its ascending node when it happens in November. The transits occur at intervals of thirteen, seven, ten, three, ten, three, &c., years, a complete cycle being 217 years. There have been ten transits this century, the last being in May, 1878, and the next, after the one this year, in May, 1891, and the one following in November, 1894. The duration of the transit will, of course, depend on the chord of the Sun's disc traversed, on the latitude of the planet at the time, and on the distance of Mercury from the Earth. On this occasion the duration of the transit from external contact at ingress to external contact at egress will be 5h. 21m. The Adelaide times of the different phases will be as follows:—External contact at ingress, November 8, 7h. 30m. 47s. a.m.; internal contact, 7h. 32m. 30s. a.m., at 129° from the North Pole of the Sun towards the east; internal contact at egress, 0h. 50m. 6s. p.m., external contact, 0h. 51m. 49s. p.m., at 79° from the North Pole towards the west. As the apparent diameter of the planet is only $10''$, whilst that of the Sun is $32' 22''$, the planet will of course appear as a minute black spot crossing the Sun's disc from east to west. Those who have good telescopes should devote their attention to the blackness of the planet as compared with the nuclei or umbra of any spots that may happen to be visible on the Sun's surface. They should also note the shape assumed by the planet at its internal contact. Whether, for instance, it assumes a pear-shaped appearance, drawn out, as it were, towards the Sun's limb in a ligament gradually getting thinner till it breaks and shows the planet well advanced on the disc at the moment of rupture at the ingress, or extending outwards towards the edge of the Sun, and gradually getting thicker at the ingress. It is this phenomenon of the black drop, as it is called, that gives rise to so much doubt in the observations of the transit of Venus. Unless observers are careful to note what they see, it is difficult to say what precise phase they have observed at the instant of contact of the planet with the edge of the Sun. It will be remembered that on the Transit of Venus in December, 1874, the planet was seen outside the Sun's disc; this should be looked for very carefully in the coming transit of Mercury. It could not be seen here at the last transit on May 6, 1878." Mr. Todd invited gentlemen desirous of taking observations to bring their instruments to the Observatory, and he would supply them with chronometers.

Mr. Todd then read the following paper on "The recent atmospheric disturbances on the east coast":—"In the absence of any more important paper, I have thought that a few remarks on the recent storms which have passed over the eastern and south-eastern portions of Australia would not be without interest to the Society. Unfortunately, the storms to which I refer have been attended by the sad loss of several vessels, and, still worse, the loss of many valuable lives. As the Society is aware, we have had in active work for some time past an extensive system of daily weather reports, which include the greater part of Australia, from the west coast at

Perth to the east coast, the whole length of the south coast, inland, the valley of the Murray and the Darling, the interior along the telegraph line, and the north coast at Port Darwin. Recently, or since the last Meteorological Conference held in Melbourne in May this year, we have had reports from Low Head in Tasmania, and also from New Zealand. We still require the co-operation of Queensland and more stations in Western Australia. You will thus see that we have now brought, as it were, daily under our eye the meteorologic condition of a large area of the Earth's surface, and possess, therefore, an immense advantage over the observer who in the past knew only what was common to all observers, and meteorology, with its complications made but slow progress. All this is now changed by the agency of the telegraph, which brings us information almost of the birthplace, but certainly of the approach and course, of storms traversing considerable distances, and often enables us to give timely warning to others situated in the direction of their march, but whom they have not yet reached. Now one of the most important facts taught us is, that nearly all atmospheric disturbances travel in a general direction from west to east, recurring, however, and pursuing an opposite direction in some places where they abut against the coast line of a continent running north and south. I have traced many storms from the east coast of Africa to Australia and New Zealand, or, at all events, have had good reasons for believing a storm first reported in the neighbourhood of the Mauritius and Madagascar to be identical with one subsequently experienced here. These disturbances are accompanied by areas of low pressure, around which the wind gyrates with more or less force, according to the steepness of the barometric gradients. In the Southern Hemisphere the wind in a cyclonic storm circulates in the direction of the hands of a watch, along the isobar, or inclined inwards towards the centre. As opposed to these cyclonic systems, we have anti-cyclonic areas of high or relatively high pressure, with a wind system setting out from the centre towards the adjoining areas of lower pressure, and circulating in the opposite direction, *i.e.*, from right to left. These facts are no doubt to you all, and I only refer to them known in order to explain what has recently occurred. An area of low pressure, with its cyclonic system of winds setting in from the westward, is felt here with north-easterly and northerly winds and falling barometer. If, as is most frequently the case, the centre passes us to the south, we shall be in the northern quadrant, and the wind will veer from the north-east to north-west, west, and the storm will leave us at south-west; but if the centre of the disturbance passes us to the north, we shall first have the wind more easterly, and it will back by south-east to south and south-west. You will always know in what direction the centre lies by remembering that, in the Southern Hemisphere, if you stand with your back to the wind, the low barometer is on your right hand. Some of these cyclonic storms have two centres of depression, and where this is the case, the barometer, after rising as the first or preceding centre passes by, will begin to fall, and the wind will back, as the influence of the second centre comes to be felt. In the interior of Australia, as on all large continents, we have a high barometer during the winter, and a relatively low barometer during the summer.

We thus have in the former season an almost permanent anti-cyclonic region inland to the north, with areas of low pressure passing frequently to the south or along the coast. Sometimes the anti-cyclonic area is much compressed, or passes over to the eastward, and occasionally it almost disappears. You will readily see that, when a cyclonic area lies to the east and an anti-cyclonic area lies to the west, we have between the centres, and to the south, or on the south coast, strong southerly south-west to south-east winds and on the contrary, when an anti-cyclonic area lies to the east, and a cyclonic area to the west, we should have strong northerly (N.E. to N.W.) winds over the space between the two centres. This explains our hot winds. Now, coming to the recent storms. The first intimation we have of any disturbance is given in our report of Tuesday morning, October 18, which shows a rapid fall in the barometer at Sydney since the previous day, and the existence of an area of low pressure to the east and south of Sydney, with steep gradients, and strong southerly gale on the coast south of Sydney. Fresh westerly winds at Sydney, and light north-easterly and northerly breeze north of Sydney. I call your attention to the isobars for that day. You will see how these isobars, 29·5, 29·6, and 29·7 are compressed about and to the south of Sydney. You will see that we had all this, and for several following days a large anti-cyclonic area of high pressure, and you will note the arrows indicating the direction of the wind circulating around the two centres, the concurring direction, after two whirls, giving rise to the cold, fresh, south, and south-east winds. We then experienced the south wind extending to Eucla. The s.s. Barrabool, two hours after leaving Sydney on the 18th, experienced a southerly gale of hurricane force with mountainous seas. On the 19th the cyclone centre had shifted a little to the south and east, but it still blew a terrific gale, extending now for some distance north of Sydney. On the south coast fresh south-east winds prevailed as far as Streaky Bay, and an area of high pressure in the form of a long loop lay along the coast from King George's Sound to the east of Kangaroo Island. Whilst the area of high barometer, which on the previous day occupied the whole of New Zealand, had shifted to the north-east on the following day, 20th, we find the barometer rising on the east coast as the cyclone moves still further to the south-east, and we have fresh southerly winds on the east coast, west and south-west in Basst Straits and Victoria, southerly in South Australia, and easterly round the Great Bight to Albany. The low barometer is now approaching New Zealand, with north-easterly winds. We now pass to the 21st, with heavy southerly gale, the full force of which was felt on the Victorian coast and round Cape Howe, and moderately on the South Australian coast to beyond Kangaroo Island. The centre of the cyclonic area is now nearly midway between Cape Howe and New Zealand, on the eastern coast of which island the barometer has now fallen to 29·6, with strong north-east gale. The cyclonic centre reached New Zealand on the 22nd and 23rd, with north-west gale over the North Island, and south-east at Dunedin, and south-west gale in the North Island on the 23rd. It will be seen that as the cyclone retreats to the south-east the anti-cyclone, which for several days has

been halting over the Great Australian Bight, as if afraid to follow in the wake of its furious brother, now ventures to advance gradually eastward, contracting in dimensions; the isobar 30.4, for instance, which on the 21st took in Albany and Cape Borda on the coast, and Alice Springs in the centre of the continent, now only occupies a small area between Streaky Bay and Kangaroo Island. South and south-south-east winds still prevail on south coast, and south-south-west on east coast. The intermediate space between the two systems was generally clouded, and heavy rain fell over the south-east portion of the continent, especially in the neighbourhood of Sydney, where $4\frac{1}{2}$ inches fell between the 18th and 19th. By the 26th the area of high pressure had moved so far eastward as to rest with its centre over Victoria, and a low-pressure area was showing south of Albany. The winds in South Australia, consequently, gradually veered to the east and north-east; and on the night of the 27th and 28th, when the low area had advanced to about the meridian and to the south of Eucla, and the high area a little south-east of Sydney, we had strange northerly hot winds, and cloudy, sultry weather. The centre of this low pressure, however, brought little or no rain to speak of, and had no force or depth; and as it passed to the south of us the wind veered to the west and south-west, with reduced temperature. In conclusion, I would draw attention to the value of isobaric maps in studying the changes of weather and forecasting what is likely to follow. At the Observatory we now lay down the isobars and direction of the wind every morning on receipt of the reports, and it is intended shortly to exhibit them at the Central Telegraph Office, and probably at Port Adelaide also. Mr. Ellery publishes a map in the *Argus*, and Mr. Russell does the same in the *Sydney Morning Herald*. On the whole, I think we may congratulate ourselves on having made some progress in the study of Australian meteorology, and admit that the conferences held in Melbourne and Sydney have produced good fruit." Mr. Todd expressed his willingness to supply the newspapers with these weather reports if they would undertake to publish them, as was done by the *Argus* in Melbourne and the *Sydney Morning Herald*. He also showed two photographs showing the new instrument for observing transits. It had entirely superseded the old instruments used for the purpose. The telescope was provided with two circles 30 inches in diameter, both of which were read off by four micrometer microscopes. A room was now being built for its reception, where it was intended to be placed on granite foundations.

The meeting then adjourned.

THE ROYAL SOCIETY OF TASMANIA.

The usual monthly evening meeting of this Society was held at the Museum on Monday, the 10th of October; His Honor Mr. Justice Dobson, V.P., in the chair.

Mr. John Hamilton, who had previously been nominated by the Council, was ballotted for, and declared duly elected as a Fellow of the Society.

The following returns for the past month were brought under notice, viz:—

1. Visitors to Museum: On Sundays, 581; on week days, 786; total, 1,367.
2. Ditto to Gardens, 4,500.
3. Plants, etc., received at Gardens:—From Mr. C. F. Creswell, Sydney, 1 bag of Norfolk Island Pine seeds; from Mr. S. Purchass, Sydney, a case of Norfolk Island Pine plants; from Messrs. H. Low and Co., London, 58 plants, of which about one-half were dead on arrival; from Mr. C. F. Creswell, Melbourne, seven new Dahlia roots.
4. Seeds sent from Gardens, to Messrs. Villmorin and Co., Paris, and the Botanic Gardens, Melbourne.
5. Books and Periodicals received.
6. Presentations to Museum—Meteorology: 1. From the Marine Board, tables from Mount Nelson and Bruny Island, for September. 2. From the Government Observer, New Zealand, printed tables from Wellington, for July and August.

Time of leafing, flowering, etc., of a few standard plants in the Botanic Gardens during September:—

- 20th Moutan Peony commencing to flower.
- 24th Oak commencing to break into leaf.
- 26th Grape vines ditto.
- 27th Ash ditto.
- 28th Sycamore ditto.
- 29th Horsechestnut commencing to flower.
- 30th Robinia Pseuda-Acacia commencing to break.

The presentations to the Museum were as follows:—

1. From the Hon. W. A. B. Gellibrand, M.L.C. A Native Tiger (*Thylacinus cynocephalus*).
2. From H. Lamb, Esq., M.H.A. Two Native Devils (*Sarcophilus ursinus*), male and female, from Clarence Plains.
3. From Mrs. Gifford. Specimens of the red-rumped Parakeet (*Psephotus hæmatonotus*), from Queensland.
4. From Mrs. Lodder. A number of additional specimens of Tasmanian Lepidoptera.
5. From Mr. Glover. A Bush Rat (*Mus. sp.*), from Huon District.
6. From Master Pulleine. Five shells from Fiji.
7. From Mr. S. H. Wintle. Specimens from the Scamander Goldfield.

The attention of the meeting was called to a donation of books, from the library of the late Dr. E. S. Hall, received from the representatives of that gentleman, and comprising about 130 bound volumes, together with a large number of official blue books, reports, pamphlets, etc.

The proceedings terminated with a vote of thanks to the author of the paper read, and to the donors of presentations to the Museum and Library.—*Communications.*



